INDRADHANUSH GAS GRID LIMITED (IGGL)
(Joint Venture of IOCL, ONGC, GAIL, OIL and NRL)
GUWAHATI, ASSAM

NORTH -EAST GAS GRID PIPELINE PROJECT

BID DOCUMENT FOR

LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

OPEN DOMESTIC COMPETITIVE BIDDING

Tender ID: 2026_IGGL_288973_1

Bid Document No.: 05/51/E-0085/IGGL/001(i)

VOLUME – I OF IV

PREPARED AND ISSUED BY

MECON LIMITED
(A Govt. of India Undertaking)
Delhi, India

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SECTION-I

INVITATION FOR BID (IFB)

SECTION-I

"INVITATION FOR BID (IFB)"

Ref No: 05/51/E-0085/IGGL/001(i) **Date: 09.09.2026**

To,

[PROSPECTIVE BIDDERS]

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL) ON OPEN DOMESTIC COMPETITIVE BIDDING BASIS

Dear Sir/Madam,

1.0 INDRADHANUSH GAS GRID LIMITED (IGGL), a Joint Venture (JV) of IOCL, ONGC, GAIL, OIL and NRL, having its registered office at Guwahati in the State of Assam, has appointed MECON Limited (hereinafter referred to as "MECON") as EPMC for "**DULIAJAN FEEDER LINE (DFL) PROJECT**". MECON Ltd. on behalf of Indradhanush Gas Grid Limited invites bids from bidders for the subject supply/job, in complete accordance with the following details and enclosed Tender Documents.
Bids submitted online on e-tendering CPP portal of Government (https://etenders.gov.in/eprocure/app) shall only be considered for processing.

2.0 The brief details of the tender are as under:

<table>
<tr><td>(A)</td><td>NAME OF WORK / BRIEF SCOPE OF WORK / JOB</td><td>LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT</td></tr>
<tr><td>(B)</td><td>TENDER NO. & DATE</td><td>05/51/E-0085/IGGL/001(i)
Tender ID: 2026_IGGL_288973_1
Date: 09.09.2026</td></tr>
<tr><td>(C)</td><td>TYPE OF BIDDING SYSTEM</td><td><table><tr><td>SINGLE BID SYSTEM</td><td>X</td></tr><tr><td>TWO BID SYSTEM</td><td>√</td></tr></table>OPEN DOMESTIC COMPETITIVE BIDDING</td></tr>
</table>

(D)	TYPE OF TENDER	<table><tr><td>E-TENDER</td><td>√</td></tr><tr><td>MANUAL</td><td>**X**</td></tr></table> **Tender ID: 2026_IGGL_288973_1**
(E)	COMPLETION/CONTRACT PERIOD	Completion schedule shall be 15 (Fifteen) months from the date of Fax of Acceptance (FOA) for Mechanical Completion including mobilization period of 1 (one) month and thereafter 3 (Three) months for completion of all balance works, drying, commissioning and Gas-in.
(F)	BID SECURITY / EARNEST MONEY DEPOSIT (EMD)	<table><tr><td>APPLICABLE</td><td>√</td></tr><tr><td>NOT APPLICABLE</td><td>**X**</td></tr></table> **Amount: INR 4,93,20,000/-** **Note:** ***MSE bidders need to submit EMD/Bid Security as per relevant clauses of tender (cl. 16 of ITB, etc), failing which bid shall be treated as 'Bid not accompanied with EMD' and shall be rejected.*** (Refer clause no.16 of ITB)
(F1)	DECLARATION FOR BID SECURITY	Start-Ups (to whom exemption is allowed as per extant guidelines in vogue) are required to submit Declaration for Bid Security as per proforma at Form F-2A
(G)	AVAILABILITY OF TENDER DOCUMENT ON WEBSITE(S)	From **09.09.2026 to 30.09.2026** (1400 Hrs, IST) on following websites: (i) IGGL's Tender Website – https://iggl.co.in (ii) Govt. CPP Portal - https://etenders.gov.in (iii) Govt. e-Procurement System of National Informatics Center (GePNIC) portal [e-tender portal] https://etenders.gov.in/eprocure/app (iv) MECON's Tender Website:-

		www.meconlimited.co.in
(H)	DATE, TIME & VENUE OF PRE-BID MEETING	**Date : 18.09.2026** **Time : 1100 Hrs (IST)** Venue Pushkar Sarovar Hotel at Dibrugarh Contact Person: Sri CP Mungkhung, GM & Proj Manager Contact no 9435359771
(HA)	SITE VISIT	**Date : 16.09.2026 to 17.09.2026** **From 1000 Hrs (IST) onwards** Assembly Point Pushkar Sarovar Hotel at Dibrugarh Contact Person: Sri CP Mungkhung, GM & Proj Manager Contact no 9435359771
(I)	DUE DATE & TIME OF BID-SUBMISSION (ON OR BEFORE)	**Date : 30.09.2026** **Time : Upto 1400 Hrs (IST)**
(J)	DATE AND TIME OF UN-PRICED BID OPENING	**Date : 01.10.2026** **Time : At 1500 Hrs (IST)** Shall be conducted through Video Conferencing Details of VC via Google Meet - Google Meet joining info Video call link: Video call link: https://meet.google.com/agz-ctwm-qbx
(K)	CONTACT DETAILS OF TENDER DEALING OFFICER	Vaidant Kumar Bairwa, DGM I/c (Contracts) MECON Limited 15th Floor, Scope Minor, District Centre, Laxmi Nagar, Delhi – 110092, India Ph. No. +91-11-22401143/ 22401224 Email : cont-delhi@meconlimited.co.in
(L)	DEALING IGGL'S OFFICE ADDRESS	Indradhanush Gas Grid Limited 7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati , Assam – 781005

In case the days specified above happens to be a holiday in IGGL, the next working day shall be implied w.r.t. bid opening and pre bid meeting, etc.

3.0 Bids must be submitted strictly in accordance with Clause No. 11 of ITB (Section-III). The IFB is an integral and inseparable part of the Tender Document.

4.0 In case of E-Tender, bid must be submitted only on https://etenders.gov.in/eprocure/app . Further, the following documents in addition to uploading the bid on e-tender portal shall

also be submitted in Original (in physical form) within 7 (seven) days from the bid due date provided the scanned copies of the same have been uploaded in e-tender by the bidder along with e-bid within the due date and time to the address mentioned in Bidding Data Sheet (BDS) [Annexure-IV to Section-III]:-

i) EMD/Bid Security / Declaration for Bid Security (As applicable)
ii) Line of Credit (If applicable)
iii) Integrity Pact (if, applicable)
iv) Power of Attorney

5.0 Bidder(s) are advised to submit their bid strictly as per terms and conditions of the Tender Documents and not to stipulate any deviations/exceptions.

6.0 Any bidder, who meets the Bid Evaluation Criteria (BEC) and wishes to quote against this Tender Document, may download the complete Tender Document along with its amendment(s) if any from websites as mentioned at 2.0 (G) of IFB and submit their Bid complete in all respect as per terms & conditions of Tender Document on or before the Bid Due Date & Time.

7.0 Bid(s) received from bidders to whom tender/information regarding this Tender Document has been issued as well as offers received from the bidder(s) by downloading Tender Document from above mentioned website(s) shall be taken into consideration for evaluation & award provided that the Bid is found responsive subject to provisions contained in Clause No. 2 of ITB (Section-III).

The Tender Document calls for offers on single point "Sole Bidder" responsibility basis (except where Consortium bid is allowed pursuant to clause no. 3.0 of ITB) and in total compliance of Scope of Supply /Specification(s) as specified in Tender Document.

8.0 Any revision, clarification, corrigendum, time extension, etc. to this Tender Document will be hosted on the above mentioned website(s) only. Bidders are requested to visit the website regularly to keep themselves updated.

9.0 All the bidders including those who are not willing to submit their bid, are required to submit F-6 (Acknowledgement cum Consent letter) duly filled within 7 days from the date of receipt of tender information.

10.0 SAP generated Request for Quotation (RFQ), if any shall also form an integral part of the Tender Document.

This is not an Order.
For & on behalf of
Indradhanush Gas Grid Limited
(Authorized Signatory)

Name : Vaidant Kumar Bairwa
Designation : DGM I/c (Contracts)
E-mail ID : cont-delhi@meconlimited.co.in
Contact No. : +91-11-22401224/ 22401143

CUT-OUT SLIP

DO NOT OPEN - THIS IS A QUOTATION

Tender Ref. No. : **05/51/E-0085/IGGL/001(i)**
(Tender ID no. 2026_IGGL_288973_1)

Description : **LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL**

Bid Due Date& Time : **On 30.09.2026 at 1400 Hrs**

From:	***To:***
…… ……	***The Dy. General Manager I/c (Contracts)*** ***MECON LIMITED*** ***15TH FLOOR, NORTH TOWER,*** ***SCOPE MINAR, LAXMI NAGAR,*** ***DELHI – 110092*** ***Ph No.: 91-11-22401143/ 22401224*** ***Email : cont-delhi@meconlimited.co.in***

(To be pasted on the envelope containing Physical documents)

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SECTION-II

BID EVALUATION CRITERIA & EVALUATION METHODOLOGY

SECTION-II

BID EVALUATION CRITERIA & EVALUATION METHODOLOGY

BID EVALUATION CRITERIA (BEC)

A. Technical Criteria

A.1 The bidder should have successfully completed "similar work" of value not less than as indicated below in last 07 (Seven) years to be reckoned from the bid due date, as mentioned under

a) At least **Three** "similar work" contract* each having minimum value **INR 19,728 Lakh** in previous 7 (seven) years reckoned from the bid due date

OR

b) At least **Two** "similar work" contract* each having minimum value **INR 24,660 Lakh** in previous 7 (seven) years reckoned from the bid due date

OR

c) At least **One** "similar work" contract* each having minimum value **INR 39,456 Lakh** in previous 7 (seven) years reckoned from the bid due date

Definition of "Similar Work": shall mean

The Bidder should have successfully executed [*]/ completed in last 07 (Seven) years to be reckoned from the bid due date, contract(s) [**] involving Laying/ Installation, Hydrotesting, Commissioning of buried Cross Country [***] hydrocarbon steel pipeline of minimum diameter 16 inch (NB) or above and minimum 90 Km length.

(*) Executed means the asset is ready for commercial use i.e., 'Hydrotesting' and 'Electronic Geometric Pigging (EGP) of the complete scope of work under the contract / work order submitted', has been completed.

(**) In case more than one Contract(s) are emanating against one tender, these Contract(s) are to be considered as a single Contract for evaluation of credentials of a Bidder for meeting their experience criteria.

(***) Cross Country pipeline means all pipeline(s) located beyond the boundary of any facility including pipelines after separator (exploratory well) and its associated facilities which are required for transportation of hydrocarbon from one point to another excluding piping within the separation and/ or gas processing plant up to plant isolation valves. The battery limit of Cross-Country pipelines of natural gas shall be limited to the upstream inlet isolation valve of City Gate Station (CGS) of any City Gas Distribution (CGD). Accordingly, City Gas Distribution network shall not be considered as Cross-Country pipeline.

A.2 EQUIPMENT DEPLOYMENT CRITERIA

Bidder shall meet the minimum construction equipment requirement as specified in the bidding document (Annexure-A to BEC).

Note to Clause A:

i) A Job executed by a Bidder for its own plant/ project cannot be considered as experience for the purpose of meeting BEC of this Tender Document. However, jobs executed for Subsidiary/Fellow subsidiary / Holding company will be considered as experience for the purpose of meeting BEC subject to submission of tax paid invoice (s) duly certified by Statutory Auditor of the Bidder towards payments of statutory tax in support of the job executed for Subsidiary/Fellow subsidiary/ Holding company. Such Bidders to submit these documents in addition to the documents specified to meet BEC.

ii) In case the bidder has an experience as a Consortium member/JV member and such a member has executed earlier a job within its scope as a member of the consortium/JV, which is required as experience as per the qualification criteria in clause no. A.1 & A.2, will be considered. Appropriate documentary evidence to establish this is to be submitted towards such experience.

iii) Eligibility criteria in case bid is submitted on the basis of technical experience of Foreign based another company (Supporting company) which holds more than fifty percent of the paid up share capital of the bidder company or vice versa (for details please refer clause no. "H" below).

iv) Consortium bids are not acceptable.

B. FINANCIAL

B.1 Annual turnover

The minimum Average Annual Financial Turnover (i.e., Revenue from Operations) of the bidder as per their audited annual financial statements during the three immediate preceding financial years shall be as **INR 16,440 Lakh**.

B.2 Net Worth

Net worth of the bidder should be positive as per the immediate preceding audited financial statement of last financial year.

For the purpose of net worth for this tender, the same shall be defined in "Format for Chartered Accountant Certificate / Certified Public Accountant (CPA) for Financial Capability of the Bidder" enclosed in the tender document.

B.3 Working Capital

The minimum working capital of the bidder as per the audited annual financial statement of last financial year shall be **INR 3,288 Lakh**.

Note to clause B:

(i) If the bidder's working capital is negative or inadequate, the bidder shall submit a letter from their bank having net worth not less than Rs.100 crores (or equivalent in USD), confirming the availability of line of credit for working capital amount, irrespective of overall position of the working capital, mentioned herein above. The line of credit letter from bank to be submitted strictly as per format at F-9.
Declaration Letter/Certificate for line of credit due to short fall of working capital shall be from single bank only. Letters from multiple banks shall not be applicable. However, banking syndicate will also be acceptable wherein a group of banks can jointly provide line of credit to the bidder.

The bank shall be required to issue the letter for declaration/ certificate of line of credit on their letter head along with the contact details of the issuing authority like email id, contact number etc.

The original document for 'Line of Credit' should be submitted along with other physical documents required as per tender conditions, or in response to commercial query, failing which bid shall be rejected.

(ii) **Average Annual Turnover:** Preceding 3 financial years mentioned in aforesaid BEC refer to immediate 3 preceding financial years wherever the closing date of the bid is after 30th September of the relevant financial year. In case the tenders having the due date for submission of bid up to 30th September (or as amended by Government time to time) of the relevant financial year, and audited financial results of the immediate 3 preceding financial years are not available, the audited financial results of the 3 years immediately prior to that will be considered.

In case the date of constitution/incorporation of the bidder is less than 3 years old, the average turnover in respect of the completed financial years after the date of constitution/ incorporation shall be taken into account for minimum Average Annual Financial Turnover criteria.

(iii) **Net Worth/Working Capital:** Immediate preceding financial year mentioned in aforesaid BEC refer to audited financial results for the immediate preceding financial year wherever the closing date of the bid is after 30th Sept. of the relevant financial year. In case the tenders having the due date for submission of bid up to 30th September (or as amended by Government time to time) of the relevant financial year, and audited financial results of the immediate preceding financial year is not available, in such case the audited financial results of the year immediately prior to that year will be considered. Bidder is to submit Audited Financial Statement of immediate preceding financial years (as mentioned above) along with format F-10 accordingly for Net worth / Working Capital.

C. Exchange rate for Conversion of Currency for evaluation of documents submitted by bidders for BEC which are in other currency than specified in BEC shall be as follows:

(a) **BEC (Technical Criteria):** Bill Selling (foreign exchange) Rate of State Bank of India as prevailing on the date of award of order/contract submitted by bidder.

(b) **BEC (Financial Criteria):**

(i) For Annual Turnover:
The average of Bill Selling (foreign exchange) Rate of State Bank of India as prevailing on the First date and Last date of the respective Financial Year.

(ii) For Net-Worth & Working Capital:
The Bill Selling (foreign exchange) Rate of State Bank of India as prevailing on the Last date of the respective Financial Year.

(c) In case, the SBI Selling rate is not available as on the date of conversion as specified above for respective cases, the exchange rate for conversion of currency shall be taken from the internet, such as:
https://www.xe.com/currencyconverter
https://economictimes.indiatimes.com/markets/forex/currency-converter
https://www.oanda.com/currency/converter

D. Only documents (Work Order, Completion certificate, Execution Certificate etc.) which have been referred/ specified in the bid shall be considered in reply to queries during evaluation of Bids. After submission of bid, only related shortfall documents will be asked for in TQ/CQ and considered for evaluation. For example, if the bidder has submitted a contract without its completion/ performance certificate, the certificate will be asked for and considered. However, no new reference/ PO/WO/LOA is to be submitted by bidder in response to TQ/CQ so as to qualify and such documents will not be considered by IGGL for evaluation of Bid.

Any shortfall information / documents on the Audited Annual Report / Financial Statement of the Bidder and/or line of credit for working capital issued on or before the final bid due date can only be sought against Commercial queries (CQs). Any information/ documents issued post final bid due date shall not be considered for evaluation.

Experience of bidder acquired as a subcontractor can be accepted against submission of certificate from end user by such bidder along with other specified documents.

In absence of such documents, IGGL / MECON reserve right to reject the bid without making any reference to the bidder or assigning any reason whatsoever.

E. RELAXATION OF PRIOR TURNOVER AND PRIOR EXPERIENCE FOR STARTUPS (AS DEFINED IN GAZETTE NOTIFICATION NO. D.L-33004/99 DATED 18.02.2016 AND 23.05.2017 OF MINISTRY OF COMMERCE AND INDUSTRY), AS AMENDMED TIME TO TIME

Not Applicable

F. DOCUMENTS TO BE SUBMITTED FOR COMPLIANCE TO BEC

Documents / Documentary Evidence required to be provided (upload in e-portal) by participating bidder along with the un-priced bid to qualify/ meet the requirements of BEC:

BEC Cl. No.	Description	Documents required for qualification
	Documents Required-Technical Criteria	

BEC Cl. No.	Description	Documents required for qualification
A.1	Experience as a single bidder	(a) Detailed work order along with Schedule of Rates. (b) Completion certificate issued by end user / Owner (or their consultant who has been duly authorized by owner to issue such certificate) OR Execution certificate (issued by the end user/ owner/authorized consultant) in place of completion certificate for meeting the stipulated experience criteria provided that the asset for which the said execution certificate has been issued is ready for commercial use i.e.; "Completion of Hydro-testing and EGP of the complete scope of work under the contract / work order submitted". **Note:** I. For Completion Certificate: The Completion Certificate shall have details like work order no., date, brief scope of work, executed order value, completion date etc. II. For Execution Certificate: The execution certificate shall have details like work order no., date, brief scope of work, executed order value, date of execution certificate, completion details of Hydrotesting and EGP of the complete scope of work under the contract / work order submitted. In case execution certificate does not have completion details of Hydrotesting and EGP of the complete scope of work under the contract / work order submitted, then, relevant RA Bill along with proof of payment is to be submitted, for Line Item- Electronic Geometric Pigging (EGP) of the complete scope of work under the contract / work order submitted.

BEC Cl. No.	Description	Documents required for qualification
A.2	Equipment Deployment Criteria	**(A) Equipment's (owned) as per Annexure-A to BEC:** 1. The bidder shall submit the certificate from chartered accountant (for ownership / possession of equipment / vehicles) as per format F-20 enclosed in the Bid Document. 2. The submission of Format F-20 is mandatory. 3. "For equipment to be purchased" - Purchase order duly accepted by equipment supplier and with equipment delivery to project site, meeting the equipment deployment schedule. However, contractor to own minimum 50% of the equipment against each type of equipment; balance 50% may be covered under to be purchased "Category". If 50% is a fraction, the same needs to be rounded off to next higher number for the minimum owned category. The purchase order shall be duly signed & stamped by Chartered Accountant / statutory auditor. Date of purchase order shall be before bid due date. 4. The bidder shall submit Certificate from Chartered Engineer certifying that the bidder own equipment is under good health and working condition as per Format F-21 enclosed in the Bid Document.
Note to A (i)	Jobs executed for Subsidiary / Fellow subsidiary / Holding company	Tax paid invoice(s) duly certified by statutory auditor of the bidder towards payments of statutory tax in support of the job executed for Subsidiary / Fellow subsidiary /Holding company.
Note to A (ii)	Experience as consortium member/JV member	(a) Same documents as mentioned in A.1 & A.2 above. (b) Consortium Agreement / MOU clearly defining the scope and responsibility. **Note:** The completion certificates shall have details like work order no., date, brief scope of work, completion date, executed order value etc.
B	**Documents Required-Financial Criteria**	
B	BEC (Financial)	A certificate for financial capability of the bidder from Practicing Chartered Accountant in prescribed format [Format F-10] as provided in the Tender Document.
B.1	Average Annual Turn-over	Bidder(s) shall submit copy of Audited Annual Financial Statement [Balance Sheet and Profit & Loss Account Statement] along with Audit Report of three (3) preceding Financial Year(s) along with un-price bid.

BEC Cl. No.	Description	Documents required for qualification
B.2	Net Worth	Bidder(s) shall submit copy of Audited Annual Financial Statement [Balance Sheet and Profit & Loss Account Statement] along with Audit Report of last Financial Year along with un-price bid.
B.3	Working Capital	Bidder(s) shall submit copy of Audited Annual Financial Statement [Balance Sheet and Profit & Loss Account Statement] alongwith Audit Report for the last audited Financial Year along with un-price bid. Note: If the bidder's working capital is negative or inadequate, the bidder shall submit a letter from their bank having net worth not less than Rs.100 crores (or equivalent in USD), confirming the availability of line of credit for working capital amount, irrespective of overall position of the working capital, mentioned herein above. The line of credit letter from bank to be submitted strictly as per format at F-9. Declaration Letter/Certificate for line of credit due to shortfall of working capital shall be from single bank only. Letters from multiple banks shall not be applicable. However, banking syndicate will also be acceptable wherein a group of banks can jointly provide line of credit to the bidder. The bank shall be required to issue the letter for declaration/ certificate of line of credit on their letter head along with the contact details of the issuing authority like email id, contact number etc. **The original document for "Line of Credit" should be submitted along with other physical documents required as per terms and conditions of tender.**

Bidder shall furnish the duly filled and signed Check list for submission of documents for qualification for Bid Evaluation Criteria (BEC) as per format F-8 (B).

G. AUTHENTICATION OF DOCUMENTS TO BE SUBMITTED IN SUPPORT OF BEC:

(i) Technical Criteria of BEC:

All documents in support of Technical Criteria of BEC are to be verified and certified by any one of the following independent third party inspection agency:

1. Société Générale de Surveillance (SGS)
2. Gulf Lloyds Industrial Services (India) Pvt. Ltd (GLISPL)
3. International Certification Services (ICS)
4. Bureau Veritas (Ind.) Pvt. Ltd (BVIS)
5. DNV GL
6. TUV Rheinland (India) Pvt. Ltd.
7. TÜV SÜD South Asia Pvt. Ltd.
8. TUV India Pvt. Ltd. (TÜV Nord Group)
9. Intertek India Pvt. Ltd.
10. Moody International (India) Pvt. Ltd.
11. RINA India Pvt. Ltd.
12. Tata Projects Ltd.
13. Competent Inspectorate and Consultants LLP
14. Apave TIV India Pvt. Ltd. [formerly known as ABS Industrial Verification (India) Pvt. Ltd.]

Further, TPIA will provide in addition a certificate toward verification and certification of documents pertaining to Technical Bid Evaluation Criteria (BEC) as per proforma attached at **Annexure-I to Section-II** and the same will be submitted by bidder in their bid.

All charges of the Third party for verification and certification shall be borne by the Bidder.

(ii) Financial Criteria of BEC:

Bidder shall submit "Details of financial capability of Bidder" in prescribed format (F-10) duly signed and stamped by a Chartered Accountant/CPA.

Further, copy of audited annual financial statements submitted in bid shall be duly certified/ attested by Notary Public with legible stamp.

In absence of requisite documents, IGGL/ MECON reserve the right to reject the bid without making any reference to the bidder.

H. Eligibility criteria in case bid is submitted on the basis of technical experience of FOREIGN BASED ANOTHER COMPANY (SUPPORTING COMPANY) which holds more than fifty percent of the paid-up share capital of the bidder company or vice versa:

Offers of those bidders (not under consortium arrangement) who themselves do not meet the technical experience criteria as stipulated in the BEC and are quoting based on the experience of Foreign based another company (Supporting Company) can also be considered. In such case the supporting company should hold more than fifty percent of the paid up share capital of the bidding company or vice versa.

However, the supporting company should on its own meet the technical experience as stipulated in the BEC and should not rely on any other company or through any other arrangement like Technical collaboration agreement.

In that case as the bidding company is dependent upon the technical experience of another company with a view to ensure commitment and involvement of the companies involved for successful execution of the contract, the participating bidder should enclose the following

Agreements/ Guarantees/ Undertakings along with the techno-commercial bid:

(i) An Agreement (*as per format enclosed at Appendix- A1* to Section II) between the bidder and the supporting company.

(ii) Guarantee (*as per format enclosed at Appendix- A2* to Section II) by the supporting company to IGGL for fulfilling the obligation under the Agreement along with certificate issued by Company Secretary as per *Appendix- A2A* to Section II.

(iii) Undertaking by Supporting Company to provide a Performance Bank Guarantee (*as per format and instructions enclosed at Appendix- A3 to* Section II), equivalent to 50% of the value of the PBG which is to be submitted by the bidding company, in case of being the successful bidder.

In cases where foreign based supporting company does not have Permanent Establishment in India as per Indian Income Tax Act, the bidding company can furnish Performance Bank Guarantee for an amount which is sum of PBG amount to be submitted by the bidder and additional PBG amount required to be submitted by the supporting company subject to the condition that supporting company have 100% paid up equity share capital of the bidder either directly or through intermediate subsidiaries or vice versa.

In such case bidding company shall furnish an undertaking that their foreign based supporting company is not having any Permanent Establishment in India in terms of Income Tax Act of India.

(iv) Undertaking from the supporting company to the effect that in addition to invoking the PBG submitted by the bidding company, the PBG provided by supporting company shall be invoked by IGGL due to non-performance of the bidding company.

Note:

1.0 In case Supporting Company fails to submit Bank Guarantee as per (iii) above, EMD/SD submitted by the bidder shall be forfeited.

2.0 The Financial BEC of tender is to be met by bidder on their own.

3.0 The Supporting Company shall meet conditions of 'Eligible Bidder', as per clause no. 2 of Section-III (ITB).

4.0 The clause J as below shall be applicable to above supporting company also.

(v) The Sub contractor / Back up agency / Supporting agency of the bidder is not put on 'Holiday' by IGGL or Public Sector Project Management Consultant (like EIL, MECON only due to "poor performance" or "corrupt and fraudulent practices") or banned/ blacklisted by Government department/ Public Sector on due date of submission of bid.

I. Apart from above, Bidder must submit all other relevant documents/ information as specified in the Scope of Work/SCC for Technical Evaluation of bid or specified elsewhere in the Tender Document, towards proof of its responsiveness.

J. PROCUREMENT FROM A BIDDER WHICH SHARES A LAND BORDER WITH INDIA

1. OM no. 7/10/2021-PPD (1) dated 23.02.2023, Department of Expenditure, Ministry of

Finance, Govt. of India refers. The same are available at website https://doe.gov.in/procurement-policy-divisions.

2. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. For details of competent authority refer to Annexure I of Order (Public Procurement no. 4) dated 23.02.2023.
   Further, any bidder (including bidder from India) having specified Transfer of Technology (ToT) arrangement with an entity from a country which shares a land border with India, shall also require to be registered with the same competent authority.
   Further the above will not apply to bidders from those countries (even if sharing a land border with India) to which the Government of India has extended lines of creditor in which the Government of India is engaged in development projects. Updated lists of countries to which lines of credit have been extended or in which development projects are undertaken are given in the website of the Ministry of External Affairs, Govt. of India

3. "Bidder" (including the term 'tenderer', 'consultant' 'vendor' or 'service provider' in certain contexts) for purpose of this provision means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency, branch or office controlled by such person, participating in a procurement process.

4. "Bidder from a country which shares a land border with India" for the purpose of this:
   a. An entity incorporated, established or registered in such a country; or
   b. A subsidiary of an entity incorporated, established or registered in such a country; or
   c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
   d. An entity whose beneficial owner is situated in such a country; or
   e. An Indian (or other) agent of such an entity; or
   f. A natural person who is a citizen of such a country; or
   g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

5. "Beneficial owner" for the purpose of above (4) will be as under:
   i. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means.
      Explanation—
      a) "Controlling ownership interest" means ownership of, or entitlement to, more than twenty-five per cent of shares or capital or profits of the company;
      b) "Control" shall include the right to appoint the majority of the directors or to control the management or policy decisions, including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
   ii) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

   iii) In case of an unincorporated association or body of individuals, the beneficial

owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;

iv) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

v) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

6. "Agent" for the purpose of this Order is a person employed to do any act for another, or to represent another in dealings with third persons

Note:

(i) A person who procures and supplies finished goods from an entity from a country which shares a land border with India will, regardless of the nature of his legal or commercial relationship with the producer of the goods, be deemed to be an Agent for the purpose of this Order.

(ii) However, a bidder who only procures raw material, components etc. from an entity from a country which shares a land border with India and then manufactures or converts them into other goods will not be treated as an Agent.]

7. "Transfer of Technology" means dissemination and transfer of all forms of commercially usable knowledge such as transfer of know-how, skills, technical expertise, designs, processes and procedures, trade secrets, which enables the acquirer of such technology to perform activities using the transferred technology independently. (Matters of interpretation of this term shall be referred to the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade, and the interpretation of the Committee shall be final.)

8. "Specified Transfer of Technology" means a transfer of technology in the sectors and/ or technologies, specified at Schedule-I, II & III of this order.

9. <u>SUBMISSION OF CERTIFICATE IN BIDS:</u>

Bidder shall submit a certificate in this regard as Form-I-A.

For cases falling under the category of Transfer of Technology, Bidder shall submit a certificate in this regard as Form-I-B.

If such certificate given by a bidder whose bid is accepted is found to be false, this would be a ground for immediate rejection of the bid/termination and further action as per "Procedure for Action in case of Corrupt/Fraudulent/ Collusive / Coercive Practices" of tender document.

10. The registration, wherever applicable, should be valid at the time of submission of bids and at the time of acceptance of bids. In respect of supply otherwise than by tender, registration should be valid at the time of placement of order. If the bidder was validly registered at the time of acceptance / placement of order, registration shall not be a relevant consideration during contract execution.

11. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority. The definition of "contractor from a country which shares a land

border with India" shall be as in Para 4 herein above. A Certificate to this regard is to be submitted by bidder is placed at Form-II.

[Note: Procurement of raw material, components, etc. does not constitute sub contracting]

K. EVALUATION METHODOLOGY

1.1 The "Schedule of rates" quoted by eligible bidders shall be taken up for evaluation.

1.2 The total price quoted by the bidder inclusive of all taxes & duties and GST based on prices filled by the bidder in the 'Schedule of Rates' format shall be considered for evaluation and award on Lowest evaluated bid/L-1 basis.

1.3 The evaluation of all techno-commercially acceptable bids, to arrive at the lowest evaluated bid, shall be carried out by adding following:

(i) Total quoted price/ Final Amount, inclusive of all taxes & duties except GST.

(ii) GST applicable on Sl. No. (i) above.

Preferences: Purchase Preference for Make in India (MII) policyshall be applicable as per Government Guideline in vogue.

1.4 In case of tie at the L1 position, the order shall be placed on the L1 bidder having a higher turnover in the previous financial year. In case there is a tie at the lowest bid (L-1) position between only startup bidders and none of them has past turnover, the order will be placed on the startup that was registered earlier with the Department of Industrial Promotion and Policy.

Note:

a) In case the bidder is covered under Composition Scheme under GST laws, then bidder should quote the price inclusive of the GST (CGST&SGST/UTGST or IGST). Further, such bidder should mention "Cover under composition system" in column for GST (CGST&SGST/UTGST or IGST) of price schedule.
b) In case any unregistered bidder is submitting their bid, Bids will be evaluated as per quoted prices without loading of GST (CGST & SGST/UTGST or IGST), if not quoted.
c) In case any cess on GST is applicable, same shall also be considered in evaluation.

L. RESTRICTING PARTICIPATION OF NCLT REFERRED BIDDERS

i. Offer from the following type of bidders / members of consortium will not be considered:
   a) Bidders who are undergoing insolvency resolution process or liquidation or bankruptcy proceeding under Insolvency and Bankruptcy Code, 2016 (Code).
   b) Bidders whose resolution process or liquidation or bankruptcy proceeding is initiated under the Code at any stage of evaluation of bid.
ii. It will be responsibility of the bidder/contractor/vendor to inform IGGL/PMC within 15 (Fifteen) days from the date of order of insolvency resolution process or liquidation or bankruptcy proceeding passed by the Adjudicating Authority namely National Company Law Tribunal (NCLT) or Debt Recovery Tribunal (DRT) under the Code.
iii. If bidder fails to share the information regarding their status of insolvency resolution process or liquidation or bankruptcy proceeding in their bid or at any latter stage, their

offer is liable to be rejected by IGGL/PMC.

iv. IGGL/PMC reserve the right to cancel / terminate the contract without any liability on the part of IGGL/PMC immediately on the commencement of insolvency resolution process or liquidation or bankruptcy proceeding of any party under the contract.

A declaration in this regard shall be furnished by the bidder as per proforma enclosed as **Annexure-II to Section-II**.

M. PROVISION REGARDING POLICY TO PROVIDE PREFERENCE TO DOMESTICALLY MANUFACTURED IRON & STEEL PRODUCTS (DMI&SP)

The bidder shall submit self-certification on their company's letter head **as per Annexure-III to Section-II** that bidder shall comply all the provisions of the above referred policy including obtaining an Affidavit of Self Certification of Domestic value addition in Iron & Steel Products from manufacturer before supply of iron and steel products required under the tender/bidding document.

Form-I-A to Section-II

UNDERTAKING ON LETTERHEAD

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

REF: OM No. 7/10/2021-PPD(l) dated 23.02.2023 of Dept of Expenditure, Ministry of Finance, Government of India (https://doe.gov.in/procurement-policy-divisions)

Dear Sir

We, *M/s*_____ ***(Name of Bidder),*** have read the clause regarding restrictions on Procurement from a Bidder of a country which shares a land border with India as mentioned in the tender document in line with the above referred guidelines dated 23.02.2023 for Procurement from a bidder which shares a land border with India and We certify that

(i) Bidder is not from such a country [ ]

(ii) If the Bidder is from such a country which shares a land border with India, has been registered with the Competent Authority. (Evidence of valid registration by the Competent Authority to be attached by the bidder) [ ]

(Bidder is to tick appropriate option (✓or X) above).

We hereby certify that we fulfill all requirements in this regard and is eligible to be considered against the subject tender.

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

Form-I-B to Section-II

UNDERTAKING ON LETTERHEAD

(Applicable in case of Transfer of Technology cases only)

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

REF: OM No. 7/10/2021-PPD(1) dated 23.02.2023 of Dept of Expenditure, Ministry of Finance, Government of India (https://doe.gov.in/procurement-policy-divisions)

Dear Sir

We, M/s_____ ***(Name of Bidder),*** have read the clause regarding restrictions on Procurement from a Bidder of a Country having Transfer of Technology (ToT) arrangement as mentioned in the tender document in line with the above referred guidelines dated 23.02.2023 for Procurement from a bidder which shares a land border with India and We certify that

(i) The Bidder does not have ToT with such a country [ ]

(i) If the Bidder is having ToT from such a country which share a land border with India, has been registered [ ]

with the Competent Authority.
(Evidence of valid registration by the Competent Authority to be attached by the bidder)

(Bidder is to tick appropriate option (✓) above).

We hereby certify that we fulfill all requirements in this regard and is eligible to be considered against the subject tender.

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

Form-II to Section-II

CERTIFICATE FOR TENDERS FOR WORKS INVOLVING POSSIBILITY OF SUB-CONTRACTING

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

REF: OM No. 7/10/2021-PPD(1) dated 23.02.2023 of Dept of Expenditure, Ministry of Finance, Government of India (https://doe.gov.in/procurement-policy-divisions)

Dear Sir
We, M/s_____ ***(Name of Bidder),*** have read the clause regarding restrictions on Procurement from a Bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries as mentioned in the tender document in line with the above referred guidelines dated 23.02.2023 for Procurement from a bidder which shares a land border with India and We certify that

(i) Bidder is not from such a country [ ]

(ii) If the Bidder is from such a country which share a land border with India, has been registered [ ]

with the Competent Authority.
(Evidence of valid registration by the Competent Authority to be attached by the bidder)

(Bidder is to tick appropriate option (✓) above).

We further certify that we will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority.

We hereby certify that we fulfill all requirements in this regard and is eligible to be considered.

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

Schedule I

List of Category-I Sensitive sectors:

Sr. No.	Sector
(i)	Atomic Energy
(ii)	Brocasting/ Print and Digital Media
(iii)	Defense
(iv)	Space
(v)	Telecommunications

Schedule II

List of Category-II Sensitive sectors:

Sr. No.	Sector
(i)	Power and Energy (including exploration/ generation/transmission/ distribution/pipeline)
(ii)	Banking and Finance including Insurance
(iii)	Civil Aviation
(iv)	Construction of ports and dams &river valley projects
(v)	Electronics and Microelectronics
(vi)	Meteorology and Ocean Observation
(vii)	Mining and extraction (including deep sea projects)
(viii)	Railways
(ix)	Pharmaceuticals & Medical Devices
(x)	Agriculture
(xi)	Health
(xii)	Urban Transportation

Schedule III

List of Sensitive Technologies:

Sr. No.	Sensitive Technologies
(i)	Additive Manufacturing (e.g. 30 Printing)
(ii)	Any equipment having electronic programmable components or autonomous systems (e.g. SCADA systems)
(iii)	Any technology used for uploading and streaming of data including broadcasting, satellite communication etc.
(iv)	Chemical Technologies
(v)	Biotechnologies including Genetic Engineering and Biological Technologies
(vi)	Information and Communication Technologies
(vii)	Software

ANNEXURE-A TO BEC

LIST OF MINIMUM EQUIPMENTS REQUIRED TO BE OWNED BY THE BIDDER

Sr. No.	Equipment Description	Quantity (Nos.)
1.	Dozer with Ripper – D7/ D6 or Equivalent	2
2.	Excavator / Back Hoe-Ex 200 & above or Equivalent	4
3.	Pipe Layer/ Side Boom – 60 T & above Capacity	4
4.	Pipe Layer/ Side Boom – 40 T & above Capacity	4

Notes:

1. Bidders who intend to qualify shall meet the requirement for construction equipment.

2. Bidders are required to submit documentary evidence of ownership of the above equipment as indicated below: -

   i. The bidder shall submit the certificate from chartered accountant (for ownership / possession of equipment / vehicles) as per format F-20 enclosed in the Bid Document.

   ii. The submission of Format F-20 is mandatory.

   iii. "For equipment to be purchased" - Purchase order duly accepted by equipment supplier and with equipment delivery to project site, meeting the equipment deployment schedule. However, contractor to own minimum 50% of the equipment against each type of equipment; balance 50% may be covered under to be purchased "Category". If 50% is a fraction, the same needs to be rounded off to next higher number for the minimum owned category. The purchase order shall be duly signed & stamped by Chartered Accountant / statutory auditor. Date of purchase order shall be before bid due date.

   iv. The bidder shall submit Certificate from Chartered Engineer certifying that the bidder own equipment are under good health and working condition as per Format F-21 enclosed in the Bid Document.

Annexure-I to Section-II

Format for Undertaking from TPIA

(on TPIA letter head duly stamped & signed)

Ref.: Date :

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

Dear Sir,

Subject: Verification and certification of documents pertaining to Technical Bid Evaluation Criteria (BEC)

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

M/s. ……having Registered office at……intend to participate in above referred tender of Indradhanush Gas Grid Limited having registered office at 7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

The tender conditions stipulates that the BIDDER shall submit Documents pertaining to Technical Bid Evaluation Criteria (BEC) duly verified and certified by designated independent Third Party Inspection Agency.

In this regard, this is to certify that copies of documents pertaining to Technical Bid Evaluation Criteria (BEC) submitted to us by the bidder have been verified and certified by us with the originals and found to be genuine. We have signed and stamped on the copies of all the verified and certified documents.

(Signature of a person duly authorized
to Sign on behalf of the TPIA)
(Seal of the Company)
Name: ……..
Contact No……

Annexure-II to Section-II

DECLARATION ON PROCEEDINGS UNDER INSOLVENCY AND BANKRUPTCY CODE 2016

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Dear Sir,

I/ We hereby declare that I/We, M/s_____, declare that:

(i) I/We am/are not undergoing insolvency resolution process or liquidation or bankruptcy proceeding as on date.

OR

(ii) I/We am/are undergoing insolvency resolution process or liquidation or bankruptcy proceeding as on date as per details mentioned below.

(a) _____

(b) _____

(c) _____

(Attach details in separate sheet)

(iii) Further, I / We also confirms that in case there is any change in status of this declaration at any stage of tendering / execution (in case of award), the same will be promptly informed to IGGL.

Note: Strike out either (i) or (ii) as applicable.

It is understood that if this declaration is found to be false, Indradhanush Gas Grid Limited shall have the right to reject my/our bid, and forfeit the EMD/CPS. If the bid has resulted in a contract, the contract will be liable for termination without prejudice to any other right or remedy (including black listing or holiday listing) available to Indradhanush Gas Grid Limited

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation
Seal:

Annexure-III to Section-II

POLICY FOR PROVIDING PREFERENCE TO DOMESTICALLY MANUFACTURED IRON & STEEL PRODUCTS IN GOVERNMENT PROCUREMENT

(TO BE SUBMITTED ON BIDDER'S LETTERHEAD)

SELF-CERTIFICATE

This has reference to "Policy for providing Preference to Domestically Manufactured Iron & Steel Products in Government Procurement" issued by Ministry of Steel, Govt. of India, vide their notification **"G.S.R. 385 (E) dated 29.05.2019 & Amendment/Addition to policy dated 31.12.2020".**

We confirm that we shall comply all the provisions of the above referred policy including obtaining an Affidavit of Self Certification of Domestic value addition in Iron & Steel Products from manufacturer before supply of iron and steel products required under the tender/bidding document no.:_____

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

Appendix-A1 to Section II

FORMAT OF AGREEMENT TO BE EXECUTED BETWEEN BIDDER AND THEIR FOREIGN BASED SUPPORTING COMPANY ON INDIAN NON-JUDICIAL STAMP PAPER OF REQUISITE VALUE DULY NOTARIZED.

This agreement made this ___ day of ____ month ____ year by and between M/s. _____ (Fill in Bidder's full name, constitution and registered office address) _____ hereinafter referred to as bidder on the first part and M/s. _____ (Fill in full name, constitution and registered office address company which hold more than fifty percent of the paid up share capital of the bidding company or vice versa) hereinafter referred to as "Supporting Company" of the second part.

Whereas

M/s. Indradhanush Gas Grid Limited (hereinafter referred to as IGGL) has invited offers vide their tender No. _____ for _____and M/s. _____ (Bidder) intends to bid against the said tender and desires to have technical support of M/s. _____ [Supporting Company]

And whereas Supporting Company represents that they have gone through and understood the requirements of the subject tender and are capable and committed to provide the services as required by the bidder for successful execution of the contract, if awarded to the bidder.

Now, it is hereby agreed to by and between the parties as follows:

a) M/s._____ (Bidder) will submit an offer to IGGL for the full scope of work as envisaged in the tender document as a main bidder and liaise IGGL directly for any clarifications etc. in this context.

b) M/s. _____[Supporting Company] undertakes to provide technical support and expertise, expert manpower and project management including financial support, if so required, to the bidder to discharge its obligations as per the Scope of Work of the tender / Contract for which offer has been made by the bidder and accepted the IGGL.

c) The Bidder/ Supporting Company holds more than 50% paid up equity capital of the Supporting Company/ Bidder.

d) This agreement will remain valid till validity of bidder's offer to IGGL including extension if any and till satisfactory performance of the contract, the same is awarded by IGGL to the bidder.

e) Supporting Company undertakes that this agreement shall remain enforceable even if their stake in Bidder is diminished during the execution of works under the contract between the Bidder and IGGL.

f) The bidder shall have the overall responsibility of satisfactory execution of the contract awarded by IGGL, however without prejudice to any rights that IGGL might have against the Supporting Company

g) It is further agreed that, if contract pursuant to Supporting Company shall be jointly and severely responsible to IGGL for the performance of works during contract period and for the satisfactory execution of the contract, and for all the consequences for non-performance thereof.

In witness whereof the parties hereto have executed this agreement on the date mentioned above.

For and on behalf of (Bidder) M/s.	For and on behalf of (Supporting Company) M/s.
Witness: 1) 2)	Witness: 1) 2)

Appendix-A2 to Section II

GUARANTEE BY THE FOREIGN BASED SUPPORTING COMPANY/ GUARANTOR
(to be executed on plain paper)

THIS DEED OF GUARANTEE executed at …….. this …….. day of …… by M/s …… (mention complete name) a company duly established and existing under the laws of ……. (insert country), having its Registered Office at …… hereinafter called "the Guarantor and/ or the Supporting Company" which expression shall, unless excluded by or repugnant to the subject or context thereof, be deemed to include its successors and permitted assignees.

FOR

M/s …… (bidder) a company duly established and existing under the laws of ……. (insert country), having its Registered Office at …… hereinafter called the "Bidder" which expression shall, unless excluded by or repugnant to the subject or context thereof, be deemed to include its successors and permitted assignees.

TOWARDS

M/s Indradhanush Gas Grid Limited, a company duly registered under the law of India having its Registered Office at 7th Floor, NRL Centre , G.S. Road, Christian Basti ,Guwahati , Assam – 781005, and having Purchase center at …… hereinafter called "IGGL" which expression shall unless excluded by or repugnant to the context thereof, be deemed to include its successor and assignees

WHEREAS IGGL has invited tender number …… for …….. on …….., and the bidder has submitted it bid number…… in response to the above mentioned tender invited by IGGL.

AND WHEREAS the bidder/ Guarantor Company holds more than 50% paid up equity capital of the Supporting Company/ Bidder .

AND WHEREAS one of the condition for acceptance of Bidder's bid against said tender is that in case the bidder is seeking to qualify upon the technical credentials of its Guarantor Company, then the bidder shall arrange a guarantee from its Guarantor Company guaranteeing due and satisfactory performance of the work covered under the said tender including any change therein as may be deemed appropriate by the IGGL at any stage.

The Guarantor represents that they have gone through and understood the requirement of the above said tender and are capable of and committed to provide technical and such other supports as may be required by the Bidder for successful execution of the same.

The Bidder and the Guarantor have entered into an agreement dated …… as per which the Guarantor shall be providing technical, financial and such other supports as may be necessary for performance of the work under the tender, if the contract is awarded to the Bidder.

Accordingly, at the request of the Bidder and in consideration of and as a requirement for the IGGL to enter into agreement(s) with the Bidder, the Guarantor hereby guarantees and undertakes that upon award of Contract to Bidder against bid number ……, made by the Bidder under tender number……:

1. The Guarantor unconditionally agrees that in case of non-performance by the Bidder of any of its obligations in any respect, the Guarantor shall, immediately on receipt of notice of demand by the IGGL , take up the job without any demur or objection, in continuation and without loss of time and without any cost to the IGGL and duly perform the obligations of the Bidder to the satisfaction of the IGGL.
2. The Guarantor agrees that the Guarantee contained herein shall remain valid till the satisfactory execution and completion of the work (including discharge of the warranty obligations) awarded to the Bidder.
3. The Guarantor shall be jointly and severally responsible to IGGL for satisfactory performance of works during contract period and for the satisfactory execution of the contract, and for all consequences for non-performance thereof.
4. The liability of the Guarantor, under the Guarantee, is limited of the Bidder for non- performance under the contract entered between IGGL and the Bidder. This will, however, be in addition to the forfeiture of the Performance and Advance Guarantees furnished by the Bidder.
5. The Guarantor agrees to execute a Corporate Guarantee in favour of IGGL, guaranteeing the performance of obligations by the Bidder, in case the Contract is awarded to the Bidder by IGGL.
6. The Guarantor represents that this Guarantee has been issued after due observance of the appropriate laws in force in India. The Guarantor hereby undertakes that the Guarantor shall obtain and maintain in full force and effect all the governmental and other approvals and consents that are necessary and do all other acts and things necessary or desirable in connection therewith or for the due performance of the Guarantor's obligations towards IGGL.
7. Any dispute arising out of or in connection with this contract, including any question regarding its existence, validity or termination, shall be referred to and finally resolved by arbitration. It is further agreed that Claims by and against the Guarantor, the Bidder and IGGL under the different contract to be entered pursuant to their relationship can be brought under a single reference and there shall be no bar on the consolidation of such proceedings before the same arbitral tribunal. The governing law shall be the laws of India and seat of arbitration shall be Guwahati, Assam, India . The language of arbitration shall be English.
8. The Guarantor hereby declares and represents that this Guarantee has been given without any undue influence or coercion, and that the Guarantor has fully understood the implications of the same.
9. In case of award of contract to the bidder, the Guarantor shall provide Performance Bank Security to IGGL, equivalent to 50% of the value of Performance Bank Security to be submitted by the bidding company, in the prescribed format within 15 days from the date of Fax of Acceptance, as guarantee for performance by the bidder/Supplier. The Guarantor hereby expressly agrees that if in the opinion of IGGL, the Bidder / Supplier has failed to perform its obligations under the contract in any manner, IGGL shall have unfettered right to invoke the said Bank guarantee. The guarantor hereby agrees that decision of IGGL about performance of the bidder / Supplier shall be final and shall not be questioned by the Guarantor. Guarantor shall have no objection to invocation of the Performance Bank Guarantee submitted by the Guarantor

   OR
   (applicable, subject to meeting the conditions stipulated in BEC in respect of additional Performance Bank Security)

In case of award of contract to the bidder, the bidder on behalf of the Guarantor shall provide additional Performance Bank Security to IGGL, equivalent to 50% of the value of Performance bank Security to be submitted by the bidding company, in the prescribed format within 15 days from the date of Fax of Acceptance, as guarantee for performance by the bidder/Supplier. The Guarantor hereby expressly agrees that if in the opinion of IGGL, the Bidder / Supplier has failed to perform its obligations under the contract in any manner, IGGL shall have unfettered right to invoke the said Bank guarantee. The Guarantor hereby agrees that decision of IGGL about performance of the bidder / Supplier shall be final and shall not be questioned by the Guarantor. Guarantor shall have no objection to invocation of the Performance Bank Security submitted by the Bidder on behalf The Guarantor represents and confirms that the Guarantor has the legal capacity, power and authority to issue this Guarantee and that giving of this Guarantee and the performance and observations of the obligations hereunder do not contravene any existing laws.

(Strike through the clause whichever is not applicable)

10. The Guarantor represents and confirms that the Guarantor has the legal capacity, power and authority to issue this Guarantee and that giving of this Guarantee and the performance and observations of the obligations hereunder do not contravene any existing laws.

For & on behalf of (Supporting Company)
M/s _____

Signature_____
Name_____
Designation _____
official seal_____

Witness:
1.Signature_____
Full Name _____
Address_____

2.Signature_____
Full Name _____
Address_____

INSTRUCTIONS FOR FURNISHING GUARANTEE

1. The official(s) executing the guarantee should affix full signature(s) on each page.
2. Resolution passed by Board of Directors of the guarantor company authorizing the signatory(ies) to execute the guarantee, duly certified by Company Secretary should be furnished along with Guarantee.

3. THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:

"BG issuance message (IFN 760 / IFN760COV For issuance of BG and IFN 767 / IFN 767 COV FOR Amendment of BG) is to be transmitted through SFMS to beneficiary's bank as below:
Name of Bank: Axis Bank
Branch: Guwahati
Branch Address: Chhibber House, Ground Floor, G.S Road, Guwahati -781005
IFSC: UTIB0000140
SWIFT Code: AXISINBB140

The issuing bank while issuing/amending the BG, should ensure that the below information is correctly captured in the message i.e., IFN 760 / IFN 760COV / IFN 767/ IFN 767COV:

Field Number	Particulars
7037	IGGL938956645

NOTE: THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:
(i) IFN 760 / IFN 760COV FOR ISSUANCE OF BANK GUARANTEE
(ii) IFN 767 / IFN 767 COV FOR AMENDMENT OF BANK GUARANTEE
(iii) THE ABOVE MESSAGE / INTIMATION SHALL BE SENT THROUGH SFMS BY THE BG ISSUING BANK TO AXIS BANK, GUWAHATI BRANCH, IFS CODE – UTIB0000140; BRANCH ADDRESS: Axis Bank, Chhibber House, Ground Floor, G.S Road, Guwahati -781005
(iv) THE SUPPLIER SHALL SUBMIT TO IGGL THE COPY OF SFMS MESSAGE AS SENT BY THE ISSUING BANK ALONG WITH THE ORIGINAL BANK GUARANTEE

Appendix-A2A to Section II

CERTIFICATE ISSUED BY COMPANY SECRETARY OF THE GUARANTOR COMPANY

"Obligations contained in deed of guarantee No. _____ furnished against tender No. _____ are enforceable against the Guarantor Company and the same do not, in any way, contravene any law of the country of which the Guarantor Company is the subject."

The above certificate should be enclosed alongwith the Guarantee.

Appendix-A3 to Section II

PROFORMA OF "BANK GUARANTEE" TOWARDS PERFORMANCE SECURITY / SECURITY DEPOSIT BY FOREIGN BASED SUPPORTING COMPANY OF THE BIDDING COMPANY

CONTRACT PERFORMANCE SECURITY /SECURITY DEPOSIT

(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

To,

To, M/sIndradhanush Gas Grid Limited _____	**Bank Guarantee No.**	
	Date of BG	
	BG Valid up to (Expiry date)	
	Claim period up to (indicate date of expiry of claim period which includes minimum three months from the expiry date)	
	Stamp Sl. No./e-Stamp Certificate No.	

Dear Sir(s),

M/s. _____ having registered office at _____ (herein after called the "SUPPLIER" which expression shall wherever the context so require include its successors and assignees) have been placed/ awarded the job/work of _____ vide PO/LOA /FOA No. _____dated_____ (herein after called CONTRACT) for Indradhanush Gas Grid Limited having registered office at 7th Floor, NRL Centre , G.S. Road, Christian Basti ,Guwahati , Assam – 781005 (herein after called the "IGGL" which expression shall wherever the context so require include its successors and assignees).

Further, M/s _____ (Name of the Supporting company) having its registered/head office at _____ based on whose experience/technical strength, the SUPPLIER has qualified for award of contract (hereinafter referred to as the 'SUPPORTING COMPANY') which expression shall, unless repugnant to the context or meaning thereof include all its successors, administrators, executors and assignees) has agreed to provide complete technical and other support to the SUPPLIER for successful completion of the contract as mentioned above, entered between IGGL and the SUPPLIER and IGGL having agreed that the 'SUPPORTING COMPANY' shall furnish to IGGL a
performance guarantee for Indian Rupees/US$ ..... towards providing complete
financial and other support to the SUPPLIER for successful completion of the contract as mentioned above,

The said M/s._____ (Supporting Company) has approached us and at their request and in consideration of the premises we having our office at _____ have agreed to give such guarantee as hereinafter mentioned.

2. We (name of the bank) _____ registered under the laws of _____ having head/registered office at _____
(hereinafter referred to as "the Bank", which expression shall, unless repugnant to the context or meaning thereof, include all its successors, administrators, executors and permitted assignees) do hereby guarantee and undertake to pay immediately on first demand in writing

any/all moneys to the extent of Indian Rs./US$ (in figures) _____ (Indian Rupees/US Dollars (in words)_____) without any demur, reservation, contest or protest and/or without any reference to the 'SUPPORTING COMPANY'. Any such demand made by IGGL on the Bank by serving a written notice shall be conclusive and binding, without any proof, on the bank as regards the amount due and payable, notwithstanding any dispute(s) pending before any Court, Tribunal, Arbitrator or any other authority and/or any other matter or thing whatsoever, as liability under these presents being absolute and unequivocal. We agree that the guarantee herein contained shall be irrevocable and shall continue to be enforceable until it is discharged by IGGL in writing. This guarantee shall not be determined, discharged or affected by the liquidation, winding up, dissolution or insolvency of the 'SUPPORTING COMPANY' and shall remain valid, binding and operative against the bank.

3. The Bank also agrees that IGGL at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance, without proceeding against the 'SUPPORTING COMPANY' and notwithstanding any security or other guarantee that IGGL may have in relation to the 'SUPPORTING COMPANY's liabilities.
4. The Bank further agrees that IGGL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said CONTRACT or to extend time of performance by the said SUPPLIER from time to time or to postpone for any time or from time to time exercise of any of the powers vested in IGGL against the said SUPPLIER/ and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said SUPPLIER or for any forbearance, act or omission on the part of IGGL or any indulgence by IGGL to the said SUPPLIER(s) or any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.
5. The Bank further agrees that the Guarantee herein contained shall remain in full force during the period that is taken for the performance of the CONTRACT and all dues of IGGL under or by virtue of this CONTRACT have been fully paid and its claim satisfied or discharged or till IGGL discharges this guarantee in writing, whichever is earlier.
6. This Guarantee shall not be discharged by any change in our constitution, in theconstitution of IGGL or that of the 'SUPPORTING COMPANY'.
7. The Bank confirms that this guarantee has been issued with observance of appropriate laws of the country of issue.
8. The Bank also agrees that this guarantee shall be governed and construed in accordance with Indian Laws and subject to the exclusive jurisdiction of Indian Courts of the place from where the purchase CONTRACT has been placed.
9. Notwithstanding anything contained hereinabove, our liability under this Guarantee is limited to Indian Rs./US$ (in figures) _____ (Indian Rupees/US Dollars (in words) _____ only) and our guarantee shall remain in force until (indicate the date of expiry of bank guarantee) _____.
10. We have power to issue this guarantee in your favor under Memorandum and Articles of Association and the undersigned has full power to do under the Power of Attorney, dated _____ granted to him by the Bank.
11. Notwithstanding anything contained herein:

a) The Bank's liability under this Guarantee shall not exceed (currency in figures) . . . . . (currency in words only) . . . . .

b) This Guarantee shall remain in force upto _____ (this date should be expiry date of defect liability period of the Contract) and any extension(s) thereof; and

c) The Bank shall be released and discharged from all liability under this Guarantee unless

a written claim or demand is issued to the Bank on or before the midnight of …….(indicate date of expiry of claim period which includes minimum three months from the expiry of this Bank Guarantee) and if extended, the date of expiry of the last extension of this Guarantee. If a claim has been received by us within the said date, all the rights of IGGL under this Guarantee shall be valid and shall not cease until we have satisfied that claim.

Details of next Higher Authority of the Officials who have issued the Bank Guarantee:
Name …….
Designation ……..

Yours faithfully,

_____
Bank by its Constituted Attorney

Signature of a person duly
Authorized to sign on behalf of the
Bank
E-mail :
Telephone/Mobile No. :

INSTRUCTIONS FOR FURNISHING
"PERFORMANCE SECURITY / SECURITY DEPOSIT" BY "BANK GUARANTEE"

1. The Bank Guarantee by successful Bidder(s) will be given on non-judicial stamp paper as per 'stamp duty' applicable. The non-judicial stamp paper should be in name of the issuing bank. In case of foreign bank, the said Bank Guarantee to be issued by its correspondent bank in India on requisite non-judicial stamp paper and place of Bid to be considered as Guwahati Assam, India .

2. A letter from the issuing bank of the requisite Bank Guarantee confirming that said Bank Guarantee and all future communication relating to the Bank Guarantee shall be forwarded to Purchaser as per format appended below.

3. The Bank Guarantee shall be from any Indian scheduled bank (excluding Co-operative banks and Regional Rural bank) or a branch of an International bank situated in India and registered with Reserve bank of India as scheduled foreign bank. However, in case of bank guarantees from banks other than the Nationalised Indian banks, the bank must be a commercial bank having net worth in excess of Rs 100 crores and a declaration to this effect shall be made by such commercial bank either in the Bank Guarantee itself or separately on its letterhead.

4. **THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:**

"BG issuance message (IFN 760 / IFN760COV For issuance of BG and IFN 767 / IFN 767 COV FOR Amendment of BG) is to be transmitted through SFMS to beneficiary's bank as below:
Name of Bank: Axis Bank
Branch: Guwahati
Branch Address: Chhibber House, Ground Floor, G.S Road, Guwahati -781005
IFSC: UTIB0000140
SWIFT Code: AXISINBB140

The issuing bank while issuing/amending the BG, should ensure that the below information is correctly captured in the message i.e., IFN 760 / IFN 760COV / IFN 767/ IFN 767COV:

Field Number	Particulars
7037	IGGL938956645

NOTE: THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:

(i) IFN 760 / IFN 760COV FOR ISSUANCE OF BANK GUARANTEE

(ii) IFN 767 / IFN 767 COV FOR AMENDMENT OF BANK GUARANTEE

(iii) THE ABOVE MESSAGE / INTIMATION SHALL BE SENT THROUGH SFMS BY THE BG ISSUING BANK TO AXIS BANK, GUWAHATI BRANCH, IFS CODE – UTIB0000140; BRANCH ADDRESS: Axis Bank, Chhibber House, Ground Floor, G.S Road, Guwahati -781005

(iv) THE SUPPLIER SHALL SUBMIT TO IGGL THE COPY OF SFMS MESSAGE AS SENT BY THE ISSUING BANK ALONG WITH THE ORIGINAL BANK GUARANTEE

MATTER TO BE MENTIONED IN COVERING LETTER TO BE SUBMITTED BY VENDOR ALONG WITH BANK GUARANTEE

1	**BANK GUARANTEE NO**	**:**				
2	**VENDOR NAME / VENDOR CODE**	**:**	**NAME**			
			VENDOR CODE			
3	**BANK GUARANTEE AMOUNT**	**:**				
4	**LOA / PO NO.**	**:**				
5	**NATURE OF BANK GUARANTEE**	**:**				
	(Please Tick (√) Whichever is Applicable		**PERFORMANCE BANK GUARANTEE**	**SECURITY DEPOSIT**	**EMD**	**ADVANCE**
6	**BG ISSUED BANK DETAILS**					
		(A)	**EMAIL ID :**			
		(B)	**ADDRESS :**			
		(C)	**PHONE NO :**			

SECTION-III

INSTRUCTION TO BIDDERS

(TO BE READ IN CONJUNCTION WITH BIDDING DATA SHEET (BDS)

SECTION-III

INSTRUCTION TO BIDDERS

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INSTRUCTIONS TO BIDDERS [ITB]
(TO BE READ IN CONJUNCTION WITH BIDDING DATA SHEET (BDS)
[A] – GENERAL

1 SCOPE OF BID

1.1 The Employer as defined in the "General Conditions of Contract [GCC]", wishes to receive Bids as described in the Invitation For Bid (the "**Tender Document /Bid Document")**issued by Employer. Employer/Owner/IGGL occurring herein under shall be considered synonymous.

1.2 SCOPE OF BID: The scope of work/ Services shall be as defined in the Tender documents.

1.3 The successful bidder will be expected to complete the scope of Bid within the period stated in Special Conditions of Contract.

1.4 Throughout the Tender Documents, the terms 'Bid', 'Tender'& 'Offer' and their derivatives [Bidder/Tenderer, Bid/Tender/Offer etc.] are synonymous. Further, 'Day' means 'Calendar Day' and 'Singular' also means 'Plural'.

2 ELIGIBLE BIDDERS

2.1 The Bidder shall not be under a declaration of ineligibility by Employer for Corrupt/ Fraudulent/ Collusive/ Coercive practices, as defined in "Instructions to Bidders [ITB], Clause No. 39" (Action in case Corrupt/ Fraudulent/ Collusive/ Coercive Practices).

2.2 The Bidder is not put on 'Holiday' by IGGL or Public Sector Project Management Consultant (like EIL, Mecon only due to "poor performance" or "corrupt and fraudulent practices") or banned/blacklisted by Government department/ Public Sector on due date of submission of bid. Further, neither bidder nor their allied agency/(ies) (as defined in the Procedure for Action in case of Corrupt/ Fraudulent/ Collusive/ Coercive Practices) are on banning list of IGGL or the Ministry of Petroleum and Natural Gas.

If the bidding documents were issued inadvertently/ downloaded from website, offers submitted by such bidders shall not be considered for opening/ evaluation/Award and will be returned immediately to such bidders.

In case there is any change in status of the declaration prior to award of contract, the same has to be promptly informed to IGGL by the bidder.

It shall be the sole responsibility of the bidder to inform about their status regarding para 1 of clause 2.2 herein above on due date of submission of bid and during the course of finalization of the tender. Concealment of the facts shall tantamount to misrepresentation of facts and shall lead to action against such Bidders as per clause 39 of ITB.

2.3 The Bidder should not be under any liquidation court receivership or similar proceedings on due date of submission of bid. In case there is any change in status of the declaration prior to award of contract, the same has to be promptly informed to IGGL by the bidder.

It shall be the sole responsibility of the bidder to inform IGGL there status on above on due date of submission of bid and during the course of finalization of the tender. Concealment of the facts shall tantamount to misrepresentation of facts and shall lead to action against such Bidders as per clause no.39 of ITB.

2.4 Bidder shall not be affiliated with a firm or entity:

(i) that has provided consulting services related to the work to the Employer during the preparatory stages of the work or of the project of which the works/services forms a part of or

(ii) that has been hired (proposed to be hired) by the Employer as an Engineer/ Consultant for the contract.

2.5 Neither the firm/entity appointed as the Project Management Consultant (PMC) for a contract nor its affiliates/ JV'S/ Subsidiaries shall be allowed to participate in the tendering process unless it is the sole Licensor/Licensor nominated agent/ vendor.

2.6 Pursuant to qualification criteria set forth in the bidding document, the Bidder shall furnish all necessary supporting documentary evidence to establish Bidder's claim of meeting qualification criteria.

2.7 Power of Attorney:

Power of Attorney (POA) to be issued by the bidder in favour of the authorised employee(s), in respect of the particular tender, for purpose of signing the documents including bid, all subsequent communications, agreements, documents etc. pertaining to the tender and act and take any and all decision on behalf of the bidder (including Consortium). Any consequence resulting due to such signing shall be binding on the Bidder (including Consortium).

(I) In case of a Single Bidder, the Power of Attorney shall be issued as per the constitution of the bidder as below:

a) **In case of Proprietorship:** by Proprietor

b) **In case of Partnership:** by all Partners or Managing Partner

c) **In case of Limited Liability Partnership:** by any bidder's employee authorized in terms of Deed of LLP

d) **In case of Public / Limited Company:** PoA in favourof authorized employee(s) by Board of Directors through Board Resolution or by the designated officer authorized by Board to do so. Such Board Resolution should be duly countersigned by Company Secretary / MD / CMD / CEO.

(II) In case of a Consortium, Power of Attorney shall be issued both by Leader as well as Consortium Member(s) of the Consortium as per procedure defined herein above in favour of employee of Leader of Consortium.

The Power of Attorney should be valid till award of contract / order to successful bidder.

2.8 In case of change of constitution of bidder after submission of bid, the same shall be informed by the bidder to IGGL promptly. Failure to same shall be considered as misrepresentation by the bidder.

3 <u>BIDS FROM "CONSORTIUM</u>" Not Applicable

3.1 Bids from consortium of two or more members (maximum three including leader) are acceptable provided that they fulfill the qualification criteria and requirements stated in the Bidding Documents. Participating Consortium shall submit the Agreement as per the format F-11clearly defining the scope and responsibility of each member. Members of consortium shall assume responsibility jointly & severally. The EMD shall be submitted by the Bidder (Consortium).

3.2 The Consortium Agreement must clearly define the leader/ lead partner, who shall be responsible for timely completion of work/ services and shall receive/ send instructions for and on behalf of the consortium during the period the bid is under evaluation as well as during the execution of contract.

3.3 All the members shall authorize the representative from the lead partner by submitting a Power of attorney (on a non judicial stamp paper of appropriate value) signed by legally authorized signatories of all the member(s). Such authorization must be accompanied with the bid. The authorized signatory shall sign all the documents relating to the tender/ contract. However, in case of award, payment shall be made to the consortium.

3.4 A consortium once established at the time of submitting the Bid shall not be allowed to be altered with respect to constituting members of the Consortium or their respective roles/ scope of work, except if and when required in writing by owner. If during the evaluation

of bids, a consortium proposes any alteration/ changes in the orientation of consortium or replacements or inclusions or exclusions of any partner(s)/ member(s) which had originally submitted the bid, bid from such a consortium shall be liable for rejection.

3.5 Any member of the consortium/ shall not be eligible either in an individual capacity or be a part of any other consortium to participate in this tender. Further, no member of the consortium/ JV shall be on 'Holiday' by IGGL or Public Sector Project Management Consultant (like EIL, Mecon only due to "poor performance" or "corrupt and fraudulent practices") or banned/blacklisted by Government department/ Public Sector on due date of submission of bid. Offer submitted by such consortium shall not be considered for opening/ evaluation/Award.

4 ONE BID PER BIDDER

4.1 A Bidder shall submit only 'one [01] Bid' in the same Bidding Process either as single entity or as a member of any consortium (wherever consortium bid is allowed). A Bidder who submits or participates in more than 'one [01] Bid' will cause all the proposals in which the Bidder has participated to be disqualified.

4.2 A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices. The bidder found to have a conflict of interest shall be disqualified. A bidder shall be considered to have a conflict of interest with one or more bidders in this bidding process, if:

a) they have controlling partner (s) in common; or

b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; or

c) they have the same legal representative/authorized signatory/agent for purposes of this bid; or

d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or

e) Bidder participates in more than one bid in bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid.

f) a Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid;

g) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business.

Bidders are required to submit a confirmation for no conflict of interest with other bidders in Format F-5..

Failure to comply this clause during tendering process will disqualify all such bidders from process of evaluation of bids.

4.3 Alternative Bids shall not be considered.

4.4 The provisions mentioned at sl. no. 4.1 and 4.2 shall not be applicable wherein bidders are quoting for different Items / Sections / Parts / Groups/ SOR items of the same tender which specifies evaluation on Items / Sections / Parts / Groups/ SOR items basis.

5 COST OF BIDDING

The Bidder shall bear all costs associated with the preparation and submission of the Bid including but not limited to Documentation Charges, Bank charges, all courier charges, translation charges, authentication charges and any associated charges including taxes & duties thereon. Further, IGGL will in no case, be responsible or liable for these costs, regardless of the outcome of the bidding process.

6 SITE VISIT

6.1 The Bidder is advised to visit and examine the site of works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a Contract for the required job. The costs of visiting the site shall be borne by the Bidder.

6.2 The Bidder or any of its personnel or agents shall be granted permission by the Employer to enter upon its premises and land for the purpose of such visits, but only upon the express conditions that the Bidder, its personnel and agents will release and indemnify the Employer and its personnel, agents from and against all liabilities in respect thereof, and will be responsible for death or injury, loss or damage to property, and any other loss, damage, costs, and expenses incurred as a result of inspection.

6.3 The Bidder shall not be entitled to hold any claim against IGGL for non-compliance due to lack of any kind of pre-requisite information as it is the sole responsibility of the Bidder to obtain all the necessary information with regard to site, surrounding, working conditions, weather etc. on its own before submission of the bid.

[B] – BIDDING DOCUMENTS

7 CONTENTS OF BIDDING DOCUMENTS

7.1 The contents of Bidding Documents / Tender Documents are those stated below, and should be read in conjunction with any 'Addendum / Corrigendum and Clarification(s)' issued in accordance with "ITB: Clause-8 &9":

- Section-I : Invitation for Bid [IFB]*
- Section-II : BID EVALUATION CRITERIA [BEC] & Evaluation methodology
- Section-III : Instructions to Bidders [ITB], Annexure, Forms & Format**
- Section-IV : General Conditions of Contract [GCC]***
- Section-V : Special Conditions of Contract [SCC]
- Section-VI : Particular Job Specificatoion
- Section-VII : Schedule of Rates

*Request for Quotation', wherever applicable, shall also form part of the Bidding Document.

**The subject tender is based on standard formats and applicability of some specific clauses may be seen in Annexure-IV to Section-III i.e. BDS (Bidding Data Sheet).
For participation in e-tender, instructions are mentioned at Annexure-III to Section-III.

7.2 The Bidder is expected to examine all instructions, forms, terms & conditions in the Bidding Documents. The "Request for Quotation [RFQ] &Invitation for Bid (IFB)" together with all its attachments thereto, shall be considered to be read, understood and accepted by the Bidders. Failure to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will be at Bidder's risk and may result in the rejection of his Bid.

8 CLARIFICATION OF TENDER DOCUMENTS

8.1 A prospective Bidder requiring any clarification(s) of the Bidding Documents may notify IGGL in writing by email at IGGL's mailing address indicated in the BDS no later than 02 (two) days prior to pre-bid meeting (in cases where pre-bid meeting is scheduled) or 05 (five) days prior to the due date of submission of bid in cases where pre-bid meeting is not scheduled. IGGL reserves the right to ignore the bidders request for clarification if received after the aforesaid period. IGGL may respond in writing to the request for clarification. IGGL's response including an explanation of the query, but without identifying the source of the query will be uploaded on e-tender portal/ communicated to prospective bidders by e-mail.

8.2 Any clarification or information required by the Bidder but same not received by the Employer at clause 8.1 (refer BDS for address) above is liable to be considered as "no clarification / information required".

9 AMENDMENT OF BIDDING DOCUMENTS

9.1 At any time prior to the 'Bid Due Date', Employer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by addenda/ corrigendum.

9.2 Any corrigendum thus issued shall be integral part of the Tender Document and shall be hosted on the websites as provided at clause no. 2.0 (G) of IFB /communicated to prospective bidders by e-mail. Bidders have to take into account all such corrigendum before submitting their Bid.

9.3 The Employer, if consider necessary, may extend the Bid Due Date in order to allow the Bidders a reasonable time to furnish their most competitive bid taking into account the addenda/corrigendum issued thereof.

[C] – PREPARATION OF BIDS

10 LANGUAGE OF BID:

The bid prepared by the Bidder and all correspondence, drawing(s), document(s), certificate(s) etc. relating to the Bid exchanged by Bidder and IGGL shall be written in English language only. In case a document, certificate, printed literature etc. furnished by the Bidder in a language other than English, the same should be accompanied by an English translation duly authenticated by the Indian Chamber of Commerce, in which case, for the purpose of interpretation of the Bid, the English translation shall govern.

11. DOCUMENTS COMPRISING THE BID

11.1 IN CASE OF MANUAL TENDERING

In case the Bids are invited under the Manual two Bid system. The Bid prepared by the Bidder shall comprise the following components sealed in 2 different envelopes:

11.1.1 **ENVELOPE-I: "TECHNO-COMMERCIAL / UN-PRICED BID"** shall contain the following:

(a) 'Covering Letter' on Bidder's 'Letterhead' clearly specifying the enclosed contents with index.

(b) 'Bidder's General Information', as per 'Form F-1'.

(c) Copies of documents, as specified in tender document
(d) Copy of Schedule of Rate (SOR) with prices blanked out mentioning quoted / not quoted (as applicable) written against each item as a confirmation that the prices are quoted in requisite format.
(e) 'Letter of Authority' on the Letter Head, as per 'Form F-3'
(f) 'Agreed Terms and Conditions', as per 'Form F-5'
(g) 'Acknowledgement Cum Consent Letter', as per 'Form F-6'
(h) Duly attested documents in accordance with the "Bid Evaluation Criteria[BEC]" establishing the qualification.
(i) Copy of Power of Attorney /copy of Board Resolution, in favour of the authorized signatory of the Bid, as per clause no.2.7 of ITB
(j) EMD in original (in case of manual tendering) / copy of EMD (in case of e-Tender), as per Clause 16 of ITB. Declaration for Bid Security as per provision of ITB.
(k) Site Visit Report as per F-26
(l) Undertaking as per *Form-2 to Annexure-V to Section-III* and Certification from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of other than companies) as per *Form-3 to Annexure-V to Section-III* ***(Applicable for all bidders irrespective of seeking purchase preference or not)***.
(m) Undertaking as per *Form-I to Section-II* regarding Provisions for Procurement from a Bidder which shares a land border with India
(n) All forms and Formats including Annexures
(o) 'Integrity Pact' as per 'Form F-14'
(p) 'Indemnity Bond' as per 'Form F-15'
(q) Tender Document, its Corrigendum/Amendment/Clarification(s) duly signed on each page (in case of manual tendering)/ digitally signed (in case of e-Tender) by the Authorized Signatory holding POA.
(r) Additional document specified in BDS, SCC, Scope of Supply or mentioned elsewhere in the Tender Document, its Corrigendum/Amendment/Clarification(s).
(s) Any other information/details required as per Bidding Document

Note: All the pages of the Bid must be signed by the "Authorized Signatory" of the Bidder holding POA.

11.1.2 ENVELOPE-II: Price Bid

i) The Prices are to be submitted strictly as per the Schedule of Rate of the bidding documents. IGGL shall not be responsible for any failure on the part of the bidder to follow the instructions.
ii) Bidders are advised NOT to mention Rebate/Discount separately, either in the SOR format or anywhere else in the offer. In case Bidder(s) intend to offer any Rebate/Discount, they should include the same in the item rate(s) itself under the "Schedule of Rates (SOR)" and indicate the discounted unit rate(s) only.
iii) If any unconditional rebate has been offered in the quoted rate the same shall be considered in arriving at evaluated price. However no cognizance shall be taken for any conditional discount for the purpose of evaluation of the bids.
iv) In case, it is observed that any of the bidder(s) has/have offered suo-moto Discount/Rebate after opening of unpriced bid but before opening of price bids such discount /rebate(s) shall not be considered for evaluation. However, in the event of the bidder emerging as the lowest evaluated bidder without considering the discount/rebate(s), then such discount/rebate(s) offered by the bidder shall be

considered for Award of Work and the same will be conclusive and binding on the bidder.

v) In the event as a result of techno-commercial discussions or pursuant to seeking clarifications / confirmations from bidders, while evaluating the un-priced part of the bid, any of the bidders submits a sealed envelope stating that it contains revised prices; such bidder(s) will be requested to withdraw the revised prices failing which the bid will not be considered for further evaluation.

11.1.3 In case of bids invited under Single Bid System (clause no. 2.0(C) of IFB refers), all the documents as specified at Clause 11.1.1 & 11.1.2 of ITB can be submitted in single envelope /folder, as per instructions of Tender Document.

11.2 **IN CASE OF E-TENDERING:**

Bidders are requested to refer instructions for participating in e-Tendering (Annexure-I to Section III), Bidders manual kit and FAQs available in e-portal and bids submitted manually shall be rejected. All pages of the Bid must be digitally signed by the "authorized signatory" of the Bidder holding Power of Attorney. The Bid must be submitted on e-tender portal (https://etenders.gov.in/eprocure/app) as follows:

11.2.1 **PART-I: "TECHNO-COMMERCIAL/UN-PRICED BID"** comprising all the above documents mentioned at 11.1.1 along with copy of EMD/Bid Security/Declaration for Bid Security, copy of Power of Attorney, copy of integrity pact and copy of line of credit (if applicable) should be uploaded in the technical bid in e-tender portal.

Further, Bidders must submit the original " EMD, Power of Attorney, Integrity Pact (wherever applicable), Line of Credit (if applicable) and any other documents specified in the Tender Document to the address mentioned in IFB, in a sealed envelope, superscribing the details of Tender Document (i.e. tender number & tender for) within 7 days from the date of un-priced bid opening.

Bidders are required to submit the EMD in original by Due Date and Time of Bid Submission or upload a scanned copy of the same in the Part-I of the Bid. If the Bidder is unable to submit EMD in original by Due Date and Time of Bid Submission, the Bidder is required to upload a scanned copy of the EMD in Part-I of Bid, provided the original EMD, copy of which has been uploaded, is received within 7 days from the Due Date of Bid Opening, failing which the Bid will be rejected irrespective of their status/ranking in tendering process and notwithstanding the fact that a copy of EMD was earlier uploaded by the Bidder.

11.2.2 **PART-II: PRICE BID**

The Prices are to be filled strictly in the Schedule of Rate of the bidding documents and provision mentioned at para 11.1.2 hereinabove and to upload in Financial bid in the e-tender portal.

11.3 In case of bids invited under *single bid system*, a single envelope containing all documents specified at Clause 11.1.1 & 11.1.2 of ITB above form the BID. All corresponding conditions specified at Clause 11.1.1 & 11.1.2 of ITB shall become applicable in such a case.

12 BID PRICES

12.1 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole works as described in Bidding Documents, based on the rates and prices submitted by the Bidder and accepted by the Employer. The prices quoted by the Bidders will be inclusive of all taxes except **GST (CGST & SGST/UTGST or IGST)**.

12.2 Prices must be filled in format for "Schedule of Rates [SOR]" enclosed as part of Tender document. If quoted in separate typed sheets and any variation in item description, unit or quantity is noticed; the Bid is liable to be rejected.

12.3 Bidder shall quote for all the items of "SOR" after careful analysis of cost involved for the performance of the completed item considering all parts of the Bidding Document. In case any activity though specifically not covered in description of item under "SOR" but is required to complete the works as per Specifications, Scope of Work / Service, Standards, General Conditions of Contract ("GCC"), Special Conditions of Contract ("SCC") or any other part of Bidding Document, the prices quoted shall deemed to be inclusive of cost incurred for such activity.

12.4 All duties, taxes and other levies [if any] payable by the Contractor under the Contract, or for any other cause except final **GST (CGST & SGST/ UTGST or IGST)** shall be included in the rates / prices and the total bid-price submitted by the Bidder.

Bidder shall indicate applicable rate of GST (CGST & SGST/ UTGST or IGST) in SOR.

12.5 Prices quoted by the Bidder, shall remain firm and fixed and valid till completion of the Contract and will not be subject to variation on any account unless any price escalation/variation is allowed elsewhere in the Tender Document.

12.6 The Bidder shall quote the prices in 'figures' & words. There should not be any discrepancy between the prices indicated in figures and the price indicated in words. In case of any discrepancy, the same shall be dealt as per clause no. 30 of ITB.

12.7 Bidder shall also mention the **Service Accounting Codes (SAC)** / **Harmonized System of Nomenclature (HSN)** at the designated place in SOR.

13 GST (CGST & SGST/ UTGST or IGST)

13.1 Bidders are required to submit copy of the GST Registration Certificate while submitting the bids wherever **GST (CGST & SGST/UTGST or IGST)** is applicable.

13.2 Quoted prices should be inclusive of all taxes and duties, except **GST (CGST & SGST or IGST or UTGST)**. Please note that the responsibility of payment of **GST (CGST & SGST or IGST or UTGST)** lies with the Contractor only. Contractor providing taxable service shall issue an e-Invoice/Invoice/Bill, as the case may be as per rules/ regulation of GST. Further, returns and details required to be filled under GST laws & rules should be timely filed by Contractor with requisite details.

Payments to Contractor for claiming **GST (CGST & SGST/UTGST or IGST)** amount will be made provided the above formalities are fulfilled. Further, IGGL may seek copies of challan and certificate from Chartered Accountant for deposit of **GST (CGST & SGST/UTGST or IGST)** collected from Owner.

13.3 In case CBIC (Central Board of Indirect Taxes and Customs)/ any tax authority / any equivalent government agency brings to the notice of IGGL that the Contractor has not remitted the amount towards GST (CGST & SGST/UTGST or IGST) collected from

IGGL to the government exchequer, then, that Contactor shall be put under Holiday list of IGGL for period of six months after following the due procedure. This action will be in addition to the right of recovery of financial implication arising on IGGL.

13.4 In case of statutory variation in **GST (CGST & SGST/UTGST or IGST),** other than due to change in turnover, payable on the contract value during contract period, the Contractor shall submit a copy of the 'Government Notification' to evidence the rate as applicable on the Bid due date and on the date of revision.

Beyond the contract period, in case IGGL is not entitled for input tax credit of **GST (CGST & SGST/UTGST or IGST)**, then any increase in the rate of **GST (CGST & SGST/UTGST or IGST)** beyond the contractual delivery period shall be to Contractor's account whereas any decrease in the rate **GST (CGST & SGST/UTGST or IGST)** shall be passed on to the Owner.

Beyond the contract period, in case IGGL is entitled for input tax credit of **GST (CGST & SGST/UTGST or IGST)**, then statutory variation in quoted **GST (CGST & SGST/UTGST or IGST)** on supply and on incidental services, shall be to IGGL's account.

Claim for payment of **GST (CGST & SGST/UTGST or IGST)**/ Statutory variation, should be raised within two [02] months from the date of issue of 'Government Notification' for payment of differential (in %) **GST (CGST & SGST/UTGST or IGST)**, otherwise claim in respect of above shall not be entertained for payment of arrears.

The base date for the purpose of applying statutory variation shall be the Bid Due Date.

13.5 Where IGGL is entitled to avail the input tax credit of **GST (CGST & SGST/UTGST or IGST)**:-

13.5.1 Owner/IGGL will reimburse the **GST (CGST & SGST/UTGST or IGST)** to the Contractor at actuals against submission of E-Invoices/Invoices as per format specified in rules/ regulation of GST to enable Owner/IGGL to claim input tax credit of **GST (CGST & SGST/UTGST or IGST)** paid. In case of any variation in the executed quantities, the amount on which the **GST (CGST & SGST/UTGST or IGST)** is applicable shall be modified in same proportion. Returns and details required to be filled under GST laws & rules should be timely filed by supplier with requisite details.

13.5.2 The input tax credit of quoted **GST (CGST & SGST/UTGST or IGST)** shall be considered for evaluation of bids, as per evaluation criteria of tender document.

13.6 Where IGGL is not entitled to avail/take the full input tax credit of **GST (CGST & SGST/UTGST or IGST)**:-

13.6.1 Owner/IGGL will reimburse **GST (CGST & SGST/UTGST or IGST)** to the Contractor at actuals against submission of E-Invoices/Invoices as per format specified in rules/ regulation of GST subject to the ceiling amount of **GST (CGST & SGST/UTGST or IGST)** as quoted by the bidder, subject to any statutory variations, except variations arising due to change in turnover. In case of any variation in the executed quantities (If directed and/or certified by the Engineer-In-Charge) the ceiling amount on which **GST (CGST & SGST/UTGST or IGST)** is applicable will be modified on pro-rata basis.

13.6.2 The bids will be evaluated based on total price including quoted **GST (CGST & SGST/UTGST or IGST)**.

13.7 IGGL will prefer to deal with registered supplier of goods/ services under GST. Therefore, bidders are requested to get themselves registered under GST, it not registered yet.

However, in case any unregistered bidder is submitting their bid, Bids will be evaluated as per quoted prices without loading of **GST (CGST & SGST/UTGST or IGST)**, if not quoted. their prices will be loaded with applicable GST (CGST & SGST/UTGST or IGST) while evaluation of bid (if applicable as per Govt. Act/ Law in vogue). Where IGGL is entitled for input credit of **GST (CGST & SGST/UTGST or IGST)**, the same will be considered for evaluation of bid as per evaluation methodology of tender document. Further, an unregistered bidder is required to mention its Income Tax PAN in bid document. Further, an unregistered bidder is required to mention its Income Tax PAN in bid document..

13.8 In case IGGL is required to pay entire/certain portion of applicable **GST (CGST & SGST/UTGST or IGST)** and remaining portion, if any, is to be deposited by Bidder directly as per **GST (CGST & SGST/UTGST or IGST)** laws, entire applicable rate/amount of **GST (CGST & SGST/UTGST or IGST)** to be indicated by bidder in the SOR.

Where IGGL has the obligation to discharge **GST (CGST & SGST/UTGST or IGST)** liability under reverse charge mechanism and IGGL has paid or is /liable to pay **GST (CGST & SGST/UTGST or IGST)** to the Government on which interest or penalties becomes payable as per GST laws for any reason which is not attributable to IGGL or ITC with respect to such payments is not available to IGGL for any reason which is not attributable to IGGL, then IGGL shall be entitled to deduct/ setoff / recover such amounts against any amounts paid or payable by IGGL to Contractor / Supplier.

13.9 Contractor shall ensure timely submission of correct invoice(s)/e-invoice(s), as per GST rules/ regulation, with all required supporting document(s) within a period specified in Contract to enable IGGL to avail input credit of GST (CGST & SGST/UTGST or IGST). Further, returns and details required to be filled under GST laws & rules should be timely filed by Contractor with requisite details.

If input tax credit is not available to IGGL for any reason not attributable to IGGL, then IGGL shall not be obligated or liable to pay or reimburse GST (CGST & SGST/UTGST or IGST) claimed in the invoice(s) and shall be entitled to deduct / setoff / recover such GST amount (CGST & SGST/UTGST or IGST) or Input Tax Credit amount together with penalties and interest, if any, against any amounts paid or becomes payable by IGGL in future to the Contractor under this contract or under any other contract.

13.10 **Anti-profiteering clause**

As per Clause 171 of GST Act it is mandatory to pass on the benefit due to reduction in rate of tax or from input tax credit to the consumer by way of commensurate reduction in prices. The Contractor may note the above and quote their prices accordingly.

13.11 In case the GST rating of contractor on the GST portal / Govt. official website is negative / black listed, then the bids may be rejected by IGGL. Further, in case rating of bidder is negative / black listed after award of work, then IGGL shall not be obligated or liable to pay or reimburse GST to such cand shall also be entitled to deduct / recover such GST along with all penalties / interest, if any, incurred by IGGL.

13.12 GST (CGST & SGST/UTGST or IGST) is implemented w.e.f. 01.07.2017 which subsumed various indirect taxes and duties applicable before 01.07.2017. Accordingly, the provisions of General Condition of Contract relating to taxes and duties which are subsumed in GST are modified to aforesaid provisions mentioned in clause no. 12 and 13 of ITB.

13.13 GST, as quoted by the bidder in Schedule of Rates, shall be deemed as final and binding for the purpose of bid evaluation (applicable for tenders where bidder quotes the GST rates). In case a bidder enters "zero/blank" GST or an erroneous GST, the bid evaluation for finalizing the L1 bidder will be done considering the "Zero" or quoted GST rate, as the case may be. No request for change in GST will be entertained after submission of bids.

In cases where the successful bidder quotes a wrong GST rate, for releasing the order, the following methodology will be followed:

- In case the actual GST rate applicable is lower than the quoted GST rate, the actual GST rate will be added to the quoted basic prices. The final cash outflow will be based on actual GST rate.
- In case the actual GST rate applicable is more than the quoted GST rate, the basic prices quoted will be reduced proportionately, keeping the final cash outflow the same as the overall quoted amount.

Based on the Total Cash Outflow calculated as above, IGGL shall place orders.

13.14 Wherever TDS under GST Laws has been deducted from the invoices raised / payments made to the Contractors, as per the provisions of the GST law / Rules, Contractors should accept the corresponding GST-TDS amount populated in the relevant screen on GST common portal (www.gst.gov.in). Further, Vendors should also download the GST TDS certificate from GST common portal (reference path: Services > User Services > View/Download Certificates option).

13.15 **Provision w.r.t. E- Invoicing requirement as per GST laws:**

Supplier who is required to comply with the requirements of E-invoice for B2B transactions as per the requirement of GST Law will ensure the compliance of requirement of E Invoicing under GST law. If the invoice issued without following this process, such invoice can-not be processed for payment by IGGL as no ITC is allowed on such invoices.

Therefore, all the payments to such supplier who is liable to comply with e-invoice as per GST Laws shall be made against the proper e-invoice(s) only. Further, returns and details required to be filled under GST laws & rules against such e-invoices should be timely filed by Supplier of Goods with requisite details.

If input tax credit is not available to IGGL for any reason attributable to supplier (both for E-invoicing cases and non-E-invoicing cases), then IGGL shall not be obligated or liable to pay or reimburse GST (CGST & SGST/UTGST or IGST) claimed in the invoice(s) and shall be entitled to deduct / setoff / recover such GST amount (CGST & SGST/UTGST or IGST) or Input Tax Credit amount together with penalties and interest, if any, by adjusting against any amounts paid or becomes payable in future to the supplier under this contract or under any other contract.

To ensure compliance, undertaking in requisite format is to be submitted by supplier as per format F-17 along with documents for release of payment.

13.16 **New Taxes & duties:** Any new taxes & duties, if imposed by the State/ Central Govt. of India after the due date of bid submission but before the Contractual Completion Date, shall be reimbursed to the Service Provider on submission of copy of notification(s) issued from State/ Central Govt. Authorities along with documentary evidence for proof of payment of such taxes & duties, but only after ascertaining it's applicability with respect to the Contract.

13.17 Full payment including GST will be released at the time of processing of invoice for payment, where the GST amount reflects in Form GSTR-2A of IGGL. However, in case where the GST amount doesn't reflect in Form GSTR-2A of IGGL, the amount of GST will be released after reflection of GST amount of corresponding invoice in Form GSTR-2A of IGGL.

14 BID CURRENCIES:

Bidders must submit bid in Indian Rupees only.

15 BID VALIDITY

15.1 Bids shall be kept valid for period specified in BDS from the final Due date of submission of bid'. A Bid valid for a shorter period may be rejected by IGGL as 'non-responsive'.

15.2 In exceptional circumstances, prior to expiry of the original 'Bid Validity Period', the Employer may request the Bidders to extend the 'Period of Bid Validity' for a specified additional period. The request and the responses thereto shall be made in writing or by email. A Bidder may refuse the request without forfeiture of his EMD / Bid Security.

A Bidder agreeing to the request will not be required or permitted to modify his Bid, but will be required to extend the validity of its EMD for the period of the extension and in accordance with "ITB: Clause-16" in all respects.

16 EARNEST MONEY DEPOSIT

16.1 Bid must be accompanied with earnest money **(i.e Earnest Money Deposit (EMD)** also known as **Bid Security)** in the form of **'Demand Draft'** / **'Banker's Cheque'/ 'Insurance Surety Bond** as per the format given in form F 2B**' / 'Fixed Deposit Receipt'/ e-bank guarantee / letter of credit [**in favour of **Indradhanush Gas Grid Limited** payable at place mentioned in **BDS]** or **'Bank Guarantee'** strictly as per the format given in form F 2 of the **Tender Document**. Bidder shall ensure that EMD submitted in the form of **'Bank Guarantee'** should have a validity of at least 'two [02] months' beyond the validity of the Bid. EMD submitted in the form of **'Demand Draft'** or **'Banker's Cheque'** should be valid for three months**.**
Bid not accompanied with EMD, or EMD not in requisite format shall be liable for rejection. The EMD shall be submitted in Indian Rupees only.

NOTE: THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:

"BG issuance message (IFN 760 / IFN760COV For issuance of BG and IFN 767 / IFN 767 COV FOR Amendment of BG) is to be transmitted through SFMS to beneficiary's bank as below:
Name of Bank: Axis Bank
Branch: Guwahati
Branch Address: Chhibber House, Ground Floor, G.S Road, Guwahati -781005
IFSC: UTIB0000140
SWIFT Code: AXISINBB140

The issuing bank while issuing/amending the BG, should ensure that the below information is correctly captured in the message i.e., IFN 760 / IFN 760COV / IFN 767/ IFN 767COV:

Field Number	Particulars
7037	IGGL938956645

NOTE: THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:
(i) IFN 760 / IFN 760COV FOR ISSUANCE OF BANK GUARANTEE
(ii) IFN 767 / IFN 767 COV FOR AMENDMENT OF BANK GUARANTEE
(iii) THE ABOVE MESSAGE / INTIMATION SHALL BE SENT THROUGH SFMS BY THE BG ISSUING BANK TO AXIS BANK, GUWAHATI BRANCH, IFS CODE – UTIB0000140; BRANCH ADDRESS: Axis Bank, Chhibber House, Ground Floor, G.S Road, Guwahati -781005
(iv) THE SUPPLIER SHALL SUBMIT TO IGGL THE COPY OF SFMS MESSAGE AS SENT BY THE ISSUING BANK ALONG WITH THE ORIGINAL BANK GUARANTEE

16.2 The bidder can also submit the EMD through online banking transaction i.e. IMPS/NEFT/RTGS etc. For this purpose, the details of IGGL's Bank Account are mentioned under BDS. While remitting, the bidder must indicate EMD and tender/E-tender no. under remarks. Bidders shall be required to submit/ upload the successful transaction details along-with their bid/e-bid in addition to forwarding the details to dealing officer through email/letter with tender reference number immediately after remittance of EMD. In absence of submitting/ uploading the remittance details, the bid is likely to be considered as bid not accompanied with EMD. Further, in case of the online transaction, submission of EMD in original is not applicable.

16.3 IGGL shall not be liable to pay any documentation charges, Bank charges, commission interest etc. on the amount of EMD. In case EMD is in the form of a 'Bank Guarantee', the same shall be from any Indian scheduled Bank (excluding Co-operative banks and Regional Rural bank) or a branch of an International Bank situated in India and registered with 'Reserve Bank of India' as Scheduled Foreign Bank. However, in case of 'Bank Guarantee' from Banks other than the Nationalized Indian Banks, the Bank must be commercial Bank having net worth in excess of Rs. 100 Crores [Rupees One Hundred Crores] and a declaration to this effect should be made by such commercial Bank either in the 'Bank Guarantee' itself or separately on its letterhead. Purchaser will verify the BG from issuing bank.

16.4 Any Bid not secured in accordance with "ITB: Clause-16.1 & Clause-16.3" may be rejected by IGGL as non-responsive.

16.5 Unsuccessful Bidder's EMD will be discharged/ returned as promptly as possible, but not later than 'thirty [30] days' after finalization of tendering process.

16.6 The successful Bidder's EMD will be discharged upon the Bidder's acknowledging the 'Award' and signing the 'Agreement' (if applicable) and furnishing the 'Contract Performance Security (CPS)/ Security Deposit' pursuant to clause no. 38 of ITB.

16.7 Notwithstanding anything contained herein, the EMD may also be forfeited in any of the following cases:

(a) If a Bidder withdraws his Bid during the 'Period of Bid Validity'
(b) If a Bidder has indulged in corrupt/fraudulent /collusive/coercive practice
(c) If the Bidder modifies Bid during the period of bid validity (after Due Date and Time for Bid Submission).
(d) Violates any other condition, mentioned elsewhere in the Tender Document, which may lead to forfeiture of EMD.

(e) In the case of a successful Bidder, if the Bidder fails to:

(i) to acknowledge receipt of the "Notification of Award" / Fax of Acceptance[FOA]",

(ii) to furnish "Contract Performance Security / Security Deposit", in accordance with "ITB: Clause-38"

(iii) to accept 'arithmetical corrections' as per provision of the clause 30 of ITB.

16.8 In case EMD is in the form of 'Bank Guarantee', the same must indicate the Tender Document No. and the name of Tender Document for which the Bidder is quoting. This is essential to have proper correlation at a later date.

16.9 **MSE bidders need to submit EMD/Bid Security as per relevant clauses of tender (cl. 16 of ITB, etc), failing which bid shall be treated as 'Bid not accompanied with EMD' and shall be rejected.** Further, Startups are exempted from the payment of EMD.

16.10 In case of forfeiture of EMD/ Bid Security, the forfeited amount will be considered inclusive of tax and tax invoice will be issued by IGGL. The forfeiture amount will be subject to final decision of IGGL based on other terms and conditions of order/ contract."

16.11 EMD/Bid Bond will not be accepted in case the same has reference of 'remitter'/'financer' other than bidder on the aforementioned financial instrument of EMD/ Bid Bond submitted by the bidder and bid of such bidder will be summarily rejected.

16A DECLARATION FOR BID SECURITY

Start-Ups (to whom exemption is allowed as per extant guidelines in vogue) are required to submit Declaration for Bid Security as per proforma at Form F-2A.

17 PRE-BID MEETING (IF APPLICABLE)

17.1 The Bidder(s) or his designated representative are invited to attend a "Pre-Bid Meeting" which will be held at address specified in IFB. It is expected that a bidder shall not depute more than 02 representatives for the meeting.

17.2 Purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage and give hands-on e-tendering.

17.3 Text of the questions raised and the responses given, together with any responses prepared after the meeting, will be uploaded on e-tender portal against the Tenderas specified in "ITB: Clause-8. Any modification of the Contents of Bidding Documents listed in "ITB: Clause-7.1", that may become necessary as a result of the Pre-Bid Meeting shall be made by the Employer exclusively through the issue of an Corrigendum pursuant to "ITB: Clause-9", and not through the minutes of the Pre-Bid Meeting.

17.4 Non-attendance of the Pre-Bid Meeting will not be a cause for disqualification of Bidder.

18 FORMAT AND SIGNING OF BID

18.1 The original and all copies of the Bid shall be typed or written in indelible ink [in the case of copies, photocopies are also acceptable] and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder (as per POA). The name and position held by each person signing, must be typed or printed below the signature. All pages of the Bid except for unamendable printed literature where entry(s) or amendment(s) have been made shall be initialed by the person or persons signing the Bid.

18.2 The Bid shall contain no alterations, omissions, or additions, unless such corrections are initialed by the person or persons signing the Bid.

18.3 In case of e-tendering, digitally signed documents to be uploaded as detailed in addendum to ITB (Annexure-III to Section III).

19 Zero Deviation And Rejection Criteria

19.1 ZERO DEVIATION: Deviation to terms and conditions of "Bidding Documents" may lead to rejection of bid. IGGL will accept bids based on terms & conditions of "Bidding Documents" only. Bidder may note IGGL will determine the substantial responsiveness of each bid to the Bidding Documents pursuant to provision contained in clause 29 of ITB. For purpose of this, a substantially responsive bid is one which conforms to all terms and conditions of the Bidding Documents without deviations or reservations. IGGL's determination of a bid's responsiveness is based on the content of the bid itself without recourse to extrinsic evidence.

Bidder is requested not to take any deviation(s)/exception(s) to the terms & conditions of Tender Document, and submit all requisite documents as mentioned in this Tender Document, failing which their Bid will be liable for rejection. If a Bidder does not reply to the queries in the permitted time frame then its Bid shall be evaluated based on the documents available in the Bid.

As a principle, clarifications from bidders after opening of tenders will not be sought. However, where clarifications / documents from the bidders on important aspects are absolutely necessary for finalization of tender, clarifications from bidder can be asked. The request for clarification shall be given in email/portal, asking the bidder to respond by a specified date, and also mentioning therein that, if the bidder does not comply or respond by the date, his tender will be liable to be rejected. Depending on the outcome, such tenders are to be ignored or considered further. No change in prices or substance of the bid including specifications, shall be offered or permitted. No post-bid clarification at the initiative of the bidder shall be entertained. The shortfall information/ documents should be sought only in case of historical documents which pre-existed bids and which have not undergone change since then.

19.2 **REJECTION CRITERIA:** Notwithstanding the above, deviation to the following clauses of Tender document shall lead to summarily rejection of Bid:

(a) Firm Price
(b) Earnest Money Deposit / Bid Security/Bid Security declaration, as applicable
(c) Specifications & Scope of Work
(d) Schedule of Rates / Price Schedule / Price Basis
(e) Duration / Period of Contract/ Completion schedule
(f) Period of Validity of Bid
(g) Price Reduction Schedule
(h) Contract Performance Security
(i) Guarantee / Defect Liability Period
(j) Arbitration / Resolution of Dispute/Jurisdiction of Court
(k) Force Majeure & Applicable Laws
(l) Integrity Pact, if Applicable
(m) Any other condition specifically mentioned in the tender document elsewhere that non-compliance of the clause lead to rejection of bid

Note: Further, it is once again reminded not to mention any condition in the Bid which is contradictory to the terms and conditions of Tender document.

20 E-PAYMENT

Indradhanush Gas Grid Limited has initiated payments to Contractors electronically, and to facilitate the payments electronically through **'e-banking'**.

[D] – SUBMISSION OF BIDS

21 SUBMISSION, SEALING AND MARKING OF BIDS

21.1 In case of e-tendering, bids shall be submitted through e-tender mode in the manner specified elsewhere in tender document. No Manual/ Hard Copy (Original) offer shall be acceptable. Physical documents shall be addressed to the owner at address specified in IFB.

21.2 In case of manual tendering bid must be submitted in sealed envelope. If the envelope is not sealed & marked as per Clause No. 11 of ITB, the employer will assume no responsibility for misplacement or pre-mature opening of the bid.

21.3 All the bids shall be addressed to the owner at address specified in IFB.

21.4 Bids submitted under the name of AGENT/ REPRESENTATIVE/ RETAINER/ ASSOCIATE etc. on behalf of a bidder/affiliate shall not be accepted.

22 DEADLINE FOR SUBMISSION OF BIDS

22.1 In case of e-bidding, the bids must be submitted through e-tender mode not later than the date and time specified in the tender documents/BDS.

22.2 In case of manual tendering EMD along with bid must be submitted within the due date & time, as specified in Clause no. 2.0 (I) of IFB and place mentioned in BDS.

22.3 IGGL may, in exceptional circumstances and at its discretion, extend the deadline for submission of Bids (8.0 and/or 9 of ITB refers). In which case all rights and obligations of IGGL and the Bidders, previously subject to the original deadline will thereafter be subject to the deadline as extended. Notice for extension of due date of submission of bid will be uploaded on e-tender portal/ communicated to the bidders.

23 LATE BIDS

23.1 Any bids received after the notified date and time of closing of tenders will be treated as late bids.

23.2 In case of e-tendering, e-tendering system of GePNIC shall close immediately after the due date for submission of bid and no bids can be submitted thereafter

23.3 EMD /physical documents received to address other than one specifically stipulated in the Tender Document will not be considered for evaluation/opening/award if not received to the specified destination within stipulated date & time.

23.4 Unsolicited Bids or Bids received to address other than one specifically stipulated in the tender document will not be considered for evaluation/opening/award if not received to the specified destination within stipulated date & time.

24 MODIFICATION AND WITHDRAWAL OF BIDS

24.1 Modification and withdrawal of bids shall be as follows:-

24.1.1 **IN CASE OF E- TENDERING**

The bidder may withdraw or modify its bid after bid submission but before the due date and time for submission as per tender document.

24.1.2 **IN CASE OF MANUAL BIDDING**

The bidder may withdraw or modify its bid after bid submission but before the due date for submission as per tender document provided that the written notice of the modification/ substitution/ withdrawal in received by IGGL prior to the deadline for submission of bid.

24.2 The modification shall also be prepared, sealed, marked and dispatched in accordance with the provisions of the clause 11, 21 & 22 of ITB with relevant 'Cut-Out Slip' duly pasted and mentioning on top of the envelope as "MODIFICATION". In case of withdrawal of bid, the Envelope containing withdrawal letter duly superscribing the envelope as "WITHDRAWAL" and "Tender Document number :…."/ communication regarding withdrawal of bid with "Tender Document number :…."/ must reach concerned dealing official of IGGL within Due date & Time of submission of Bid. No bid shall be modified/ withdrawn after the Due Date & Time for Bid submission.

24.3 Any withdrawal/ modification/substitution of Bid in the interval between the Due Date & Time for Bid submission and the expiration of the period of bid validity specified by the Bidder in their Bid shall result in the Bidder's forfeiture of EMD pursuant to clause 16 of ITB invocation of action as per Bid Security declaration and rejection of Bid.

24.4 The latest Bid submitted by the Bidder before Bid Due Date & Time shall be considered for evaluation and all other Bid(s) shall be considered to be unconditionally withdrawn.

[E] – BID OPENING AND EVALUATION

25 Employer's Right To Accept Any Bid And To Reject Any Or All Bids

25.1 IGGL reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids, at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder(s) or any obligations to inform the affected Bidder(s) of the ground for IGGL's action. However, Bidder if so desire may seek the reason (in writing) for rejection of their Bid to which IGGL shall respond quickly.

25.2 A bidder is to be permitted to send his representation in writing to dealing officer specified in tender for rejection of bid. But, such representation has to be sent upto 10(ten) days from the date of Notification of Award/FOA.A decision on representation will be taken by IGGL within 15 (fifteen) days of the receipt of the representation. Only a directly affected bidder can represent in this regard:

i) Only a bidder who has participated in tender can make such representation

ii) In case technical bid has been evaluated before the opening of the financial bid, an application for review in relation to the financial bid may be filed only by a bidder whose technical bid is found to be acceptable

25.3 However, following decisions of IGGL shall not be subject to review:

a) Determination of the need for procurement;
b) Selection of the mode of procurement or bidding system;
c) Choice of selection procedure;
d) Provisions limiting participation of bidders in the procurement process;

e) The decision to enter into negotiations with the L1 bidder;
f) Cancellation of the procurement process except where it is intended to subsequently re-tender the same requirements;
g) Issues related to ambiguity in contract terms may not be taken up after a contract has been signed, all such issues should be highlighted before consummation of the contract by the vendor/ contractor; and
h) Complaints against specifications except under the premise that they are either vague or too specific so as to limit competition may be permissible.

26 BID OPENING

26.1 ***Unpriced Bid Opening :***
IGGL will open bids, in the presence of bidders' designated representatives who choose to attend, at date, time and location stipulated in the BDS. The bidders' representatives, who are present shall sign a bid opening register evidencing their attendance.

26.2 ***Priced Bid Opening***:
26.2.1 IGGL will open the price bids of those Bidders who meet the qualification requirement and whose bid is determined to be technically and commercially responsive. Techno-commercial bid evaluation status will be are to be informed to all bidders (including informing the techno-commercially not qualified Bidders). Price bids are to be opened in the presence of only techno-commercially acceptable bidders, who are willing to attend the bid opening, at a pre-publicised date, time and place or on the portal in case of e-procurement. The bidder's name, bid price, discount (if any) and any such details considered appropriate shall be read out during the price bid opening. Offers should not, repeat not, be circulated amongst the bidder's representative. Bidders selected for opening of their price bid shall be informed about the date & time of price bid opening. Bidders may depute their authorized representative to witness the price bid opening. The Bidders' representatives, who are present shall sign a Price Bid Opening Register evidencing their attendance and may be required to be present even on a short notice.

26.2.2 The price bids of those Bidders who were not found to be techno-commercially responsive shall not be opened in both manual tendering and e-tendering.
26.3 In case of bids invited under the single bid system, bid shall be opened on the specified due date & time.

27 CONFIDENTIALITY

Information relating to the examination, clarification, evaluation and comparison of bids, and recommendations for the award of a contract, shall not be disclosed to bidders or any other person not officially concerned with such a process until the award to the successful bidder.

28 CONTACTING THE EMPLOYER

28.1 From the time of bid opening to the time of contract award, no bidder shall contact IGGL on any matter related to the bid, except on request and prior written permission.

28.2 Any effort by the bidder to influence IGGL in bid evaluation, bid comparison or contract award decisions will vitiate the process and will result in the rejection of the bidder's bid and action shall be initiated as per the IGGL's procedure for action in case Corrupt /

Fraudulent / Collusive / Coercive practices in this regard apart from forfeiture of EMD/ Bid Security, if any.

29 Examination of Bids And Determination Of Responsiveness

29.1 The employer's determination of a bid's responsiveness is based on the content of the bid only. Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid:-

(a) Meets the "Bid Evaluation Criteria" of the Bidding Documents;
(b) Has been properly signed;
(c) Is accompanied by the required 'Earnest Money / Bid Security / Bid Security Declaration';
(d) Is substantially responsive to the requirements of the Bidding Documents; and
(e) Provides any clarification and/or substantiation that the Employer may require to determine responsiveness pursuant to "ITB: Clause-29.2"

29.2 A substantially responsive Bid is one which conforms to all the terms, conditions and specifications of the Bidding Documents without material deviations or reservations or omissions for this purpose employer defines the foregoing terms below:-

a) "Deviation" is departure from the requirement specified in the tender documents.
b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirement in the tender documents.
c) "Omission" is the failure to submit part or all of the information or documentation required in the tender document for evaluation of bid.

29.3 A material deviation, reservation or omission is one that,

a) If accepted would,
   i) Affect in any substantial way the scope, quality, or performance of the job as specified in tender documents.
   ii) Limit, in any substantial way, inconsistent with the Tender Document, the Employer's rights or the tenderer's obligations under the proposed Contract.
b) If rectified, would unfairly affect the competitive position of other bidders presenting substantially responsive bids.

29.4 The employer shall examine all aspects of the bid to confirm that all requirements have been met without any material deviation, reservation or omission.

29.5 Tenders that do not meet the basic requirements specified in the bid documents are to be treated as unresponsive {both during Techno-commercial evaluation and Financial Evaluation incase of Two Bid System) and will be ignored. All tenders received will first be scrutinized to see whether the tenders meet the basic requirements as incorporated in the Bid document and to identify unresponsive tenders, if any. Unresponsive offers may not subsequently be made responsive by correction or withdrawal of the non-conforming stipulation. Some important points on the basis of which a tender may be declared as unresponsive and be ignored during the initial scrutiny are:

i) The tender is not in the prescribed format or is unsigned or not signed as per the stipulations in the bid document;
ii) The required EMD has not been provided or exemption from EMD is claimed without acceptable proof of exemption;
iii) The bidder is not eligible to participate in the bid as per laid down eligibility criteria
iv) The bid departs from the essential requirements specified in the bidding document(for example, the tenderer has not agreed to give there quired contract performance

security);or

v) Against a schedule in the list of requirements in the tender enquiry, the tenderer has not quoted for the entire requirement as specified in that schedule (example: in a schedule, it has been stipulated that the tenderer will supply the equipment, install and commission it and also train the IGGL's personnel for operating the equipment. The tenderer has, however, quoted only for supply of the equipment).

30 CORRECTION OF ERRORS

30.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors in Price Schedule/Schedule of Rates (SOR) will be corrected by the Employer as follows:

(i) When there is a difference between the rates in figures and words, the rate which corresponds to the amount worked out by the Bidder (i.e. by multiplying the quantity and rate) shall be taken as correct.

(ii) When the rate quoted by the Bidder in figures and words tallies but the amount is incorrect, the rate quoted by the bidder shall be taken as correct and not the amount. The amount shall be re-calculated/ corrected accordingly.

(iii) In case a Price Schedule/ Schedule of Rate is having provisions of sub-total and grand total and there is a difference between "sum of sub totals" and "grand total", "sum of sub totals" shall be taken as correct.

(iv) When it is not possible to ascertain the correct rate, in the manner prescribed above, the rate as quoted in words shall be adopted and the amount worked out, for comparison purposes.

(v) In case any bidder does not quote for any item(s) of "Schedule of Rates" and the estimated price impact is more than 10% of the quoted price, then the bid will be rejected. If such price impact of unquoted items is 10% or less of his quoted price, then the unquoted item(s) shall be loaded highest of the price quoted by the other bidders . If such bidder happens to be lowest evaluated bidder, price of unquoted items shall be considered as included in the quoted bid price.

30.2 The discrepancy in bid shall be conveyed to the bidder asking to respond by a target date and if the bidder does not agree with observation, its Bid is liable to be rejected, and the EMD shall be forfeited / actions shall be invoked as per Declaration for Bid Security.

30.3 The above provision of Correction of Error shall not be applicable for E-tendering.

31 CONVERSION TO SINGLE CURRENCY FOR COMPARISON OF BIDS

Not Applicable. All bids submitted must be in the currency specified at clause 14 of ITB.

32 EVALUATION AND COMPARISON OF BIDS

Bid shall be evaluated as per evaluation criteria mentioned in Section-II of bidding documents on lowest bid.

In case of a tie at the lowest bid (L1) position between two or more bidders, the order/LoA will be placed on the bidder who has higher/ highest turnover in last audited financial year.

In case there is a tie at the lowest bid (L1) position between only startup bidders and none of them has past turnover, the order/LoA will be placed on the startup who is registered earlier with Department for Promotion of Industry and Internal Trade.

33 COMPENSATION FOR EXTENDED STAY

Please refer clause no. 42 of Special Conditions of Contract

34 PURCHASE PREFERENCE

Purchase Preference as per Policy to Provide Purchase Preference as per Public Procurement (Preference to Make in India), Order 2017 shall be allowed as per Government instructions in vogue, as applicable from time to time.

The Policy to Provide Purchase Preference as per Public Procurement (Preference to Make in India), Order 2017 is enclosed as Annexure V to ITB herewith.

[F] – AWARD OF CONTRACT

35 AWARD

Subject to "ITB: Clause-29", IGGL will award the Contract to the successful Bidder whose Bid has been determined to be substantially responsive and has been determined as the lowest provided that bidder, is determined to be qualified to satisfactorily perform the Contract.

"IGGL ***intent to place the contract directly on the address from where Goods are produced/dispatched or Services are rendered. In case, bidder wants contract at some other address or supply of Goods/ Services from multiple locations, bidder is required to provide in their bid address on which order is to be placed".***

IGGL will place the Contract directly on the successful bidder from whom the bid has been received & evaluated and will not place order on other entities such as subsidiary, business associate or partner, dealer/distributor etc. of the Bidder.

36 NOTIFICATION OF AWARD / FAX OF ACCEPTANCE

36.1 Prior to the expiry of 'Period of Bid Validity', Notification of Award for acceptance of the Bid will be intimated to the successful Bidder by IGGL either by E-mail /Letter or like means defined as the "Fax of Acceptance (FOA)". The Contract shall enter into force on the date of FOA and the same shall be binding on IGGL and successful Bidder (i.e. Contractor). The Notification of Award/FOA will constitute the formation of a Contract. The detailed Letter of Acceptance shall be issued thereafter incorporating terms & conditions of Tender Document, Corrigendum, Clarification(s), Bid and agreed variation(s)/acceptable deviation(s), if any. IGGL may choose to issue Notification of Award in form of detailed Letter of Acceptance without issuing FOA and in such case the Contract shall enter into force on the date of detailed Letter of Acceptance only.

36.2 Contract period shall commence from the date of "Notification of Award" or as mentioned in the Notification of Award. The "Notification of Award" will constitute the formation of a Contract, until the Contract has been effected pursuant to signing of Contract Agreement as per "ITB: Clause-37".

36.3 Upon the successful Bidder's / Contractor's furnishing of 'Contract Performance Security / Security Deposit', pursuant to "ITB: Clause-38", IGGL will promptly discharge his 'Earnest Money Deposit / Bid Security', pursuant to "ITB: Clause-16"

36.4 The Order/ contract value mentioned above is subject to Price Reduction Schedule clause.

36.5 IGGL will award the Contract to the successful Bidder, who, within 03 days' of receipt of the same, shall sign and return the acknowledged copy to IGGL.

37 SIGNING OF AGREEMENT

37.1 The successful Bidder/Contractor shall be required to execute an 'Agreement' (in case the individual contract value as specified in Notification of Award is more than INR 10 Lakhs exclusive of GST) in the proforma given in this Bidding Document on a 'non-judicial stamp paper' of appropriate value [cost of the 'stamp-paper' shall be borne by the successful Bidder/Contractor] and of 'State of India' specified in Bidding Data Sheet (BDS)only, within 'fifteen [15] days' of receipt of the "Fax of Acceptance [FOA]" of the Tender by the successful Bidder/Contractor failure on the part of the successful Bidder/Contractor to sign the 'Agreement' within the above stipulated period, shall constitute sufficient grounds for forfeiture of EMD/Security Deposit / Action as per Bid Security declaration.

37.3 Bidders can request Bilingual (Hindi & English) Contract Agreement. The format for signing Contract Agreement in English is attached with this Bidding Document.

38 CONTRACT PERFORMANCE SECURITY / SECURITY DEPOSIT [CPS/SD]

38.1 Within 30 days of the receipt of the notification of award/ Fax of Acceptance from IGGL, the successful bidder shall furnish the Contract Performance Security (CPS) in accordance with of General Conditions of the Contract. The CPS shall be in the form of either Banker's Cheque or Demand Draft or Insurance Surety Bond or Fixed Deposit Receipt or Bank Guarantee **(including e-Bank Guarantee)** or Letter of Credit and shall be in the currency of the Contract. However, CPS shall not be applicable in cases wherein the individual contract value as specified in Notification of Award is less than INR 5 Lakh (exclusive of GST).

38.2 The contract performance security shall be for an amount equal to specified in Bidding Data Sheet (BDS)towards faithful performance of the contractual obligations and performance of equipment. For the purpose of CPS, Contract/order value shall be exclusive of GST (CGST & SGST/UTGST or IGST).

SD / CPBG @ 10% of Total Order / Contract value within 30 days of FOA / notification of award.

OR

Initial security deposit (ISD) @ 5% of Total Contract value within 30 days of FOA / notification of award and deduction @ 10% of the RA bill subsequently from the RA bills till the total amount of security deposit (including ISD and deducted amount) reaches 10% of Total Contract value.

Bank Guarantee towards CPS shall be from any Indian scheduled bank (excluding Co-operative banks and Regional Rural bank) or a branch of an International bank situated in India and registered with Reserve bank of India as scheduled foreign bank. However, in case of bank guarantees from banks other than the Nationalized Indian banks, the bank must be a commercial bank having net worth in excess of Rs 100 crores and a declaration to this effect should be made by such commercial bank either in the Bank Guarantee itself or separately on its letterhead. This bank guarantee shall be valid for a period of three months beyond the DLP specified in Bid Data Sheet.

38.3 Failure of the successful bidder to comply with the requirements of this article shall constitute sufficient grounds for consideration of the annulment of the award and forfeiture of the EMD / action as per declaration for Bid Security.

38.4 The CPS has to cover the entire contract value including extra works/services also. As long as the CPS submitted at the time of award take cares the extra works/ services executed and total executed value are within the awarded contract price, there is no need for additional CPS. As soon as the total executed value is likely to burst the ceiling of

awarded contract price, the contractor should furnish additional CPS.

38.5 Further, Ministry of Finance (MOF) Department of financial service has issued direction for submission of Bank Guarantee through online vide letter ref number F.No.7/112/2011-BOA dated 17th July 2012. The successful bidder can submit CPS online through issuing bank to IGGL directly as per the above direction including its revisions, if any. In such cases confirmation will not be sought from issuing banker by IGGL.

38.6 In addition to existing specified form (i.e. Demand Draft (DD)/ Banker's Cheque/ Bank Guarantee/Letter of Credit) mentioned in tender documents for submission of Security Deposit/ Contract Performance Security, the successful bidder can also submit the Security Deposit/ Contract Performance Security through online banking transaction i.e. IMPS/NEFT/RTGS/SWIFT etc. For this purpose, the details of IGGL's Bank Account is mentioned in BDS. Further, in case a successful Bidder is willing to furnish CPS through SWIFT, the details may be obtained from Purchase Officer immediately after receipt of FOA.

While remitting such online transaction, the bidder must indicate "**Security Deposit/ Contract Performance Security against FOA/DLOA no. _____(contractor to specify the FOA/DLOA No.)**" under remarks column of such transaction of respective bank portal. The contractor/vendor shall be required to submit the successful transaction details to the dealing officer immediately through email/letter and necessarily within 30 days from the date of Fax of Acceptance.

38.7 In case of forfeiture of Contract Performance Security/ Security Deposit in terms of GCC, the forfeited amount will be considered inclusive of tax and tax invoice will be issued by IGGL. The forfeiture amount will be subject to final decision of IGGL based on other terms and conditions of order/ contract.

38.8 The Contractor will also submit covering letter along with CPS as per format at F-4.

38.9 CPBG/Security Deposit will not be accepted in case the same has reference of 'remitter'/'financer' other than bidder on the aforementioned financial instrument of CPBG/ Security Deposit submitted by the Contractor.

38.10 The first payment to vendor is to be released only after submission of CPS / Security Deposit (SD).

38.11 Before the CPS / Security Deposit (SD) is released a "No Claim Certificate" is to be submitted by the supplier/vendor.

38.12 ***In case, IGGL allows additional time for submission of CPBG/SD beyond 30 days, a penal interest of Marginal Cost of Fund based Lending Rate (MCLR) for one year charged by SBI (applicable on due date of submission of CPBG/SD i.e. 30th day after issuance of FOA/Notification of award) plus 4.0% p.a (on CPBG/SD amount) shall be charged for delay beyond 30 days i.e. from 31st days after issuance of FOA.***

38.13 THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:

"BG issuance message (IFN 760 / IFN760COV For issuance of BG and IFN 767 / IFN 767 COV FOR Amendment of BG) is to be transmitted through SFMS to beneficiary's bank as below:
Name of Bank: Axis Bank Branch: Guwahati
Branch Address: Chhibber House, Ground Floor, G.S Road, Guwahati -781005 IFSC:

UTIB0000140
SWIFT Code: AXISINBB140
The issuing bank while issuing/amending the BG, should ensure that the below information is correctly captured in the message i.e., IFN 760 / IFN 760COV / IFN 767/ IFN 767COV:

Field Number	Particulars
7037	IGGL938956645

NOTE: THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:

(i) IFN 760 / IFN 760COV FOR ISSUANCE OF BANK GUARANTEE

(ii) IFN 767 / IFN 767 COV FOR AMENDMENT OF BANK GUARANTEE

(iii) THE ABOVE MESSAGE / INTIMATION SHALL BE SENT THROUGH SFMS BY THE BG ISSUING BANK TO AXIS BANK, GUWAHATI BRANCH, IFS CODE –UTIB0000140; BRANCH ADDRESS: Axis Bank, Chhibber House, Ground Floor, G.S Road, Guwahati -781005

(iv) THE SUPPLIER SHALL SUBMIT TO IGGL THE COPY OF SFMS MESSAGE AS SENT BY THE ISSUING BANK ALONG WITH THE ORIGINAL BANK GUARANTEE

39 PROCEDURE FOR ACTION IN CASE CORRUPT/ FRAUDULENT/COLLUSIVE/ COERCIVE PRACTICES

39.1 Procedure for action in case Corrupt/ Fraudulent/Collusive/Coercive Practices is enclosed at Annexure-I.

39.2 The Fraud Prevision Policy document is available on IGGL's website (https://iggl.co.in).

39.3 Name and contact details of nodal officer- Refer BDS for details

39.4 **NON-APPLICABILITY OF ARBITRATION CLAUSE IN CASE OF BANNING OF VENDORS/ SUPPLIERS / CONTRACTORS/BIDDERS/ CONSULTANTS INDULGED IN FRAUDULENT/ COERCIVE PRACTICES**

Notwithstanding anything contained contrary in GCC and other "CONTRACT DOCUMENTS", in case it is found that the Contractors / Bidders indulged in fraudulent/ coercive practices at the time of bidding, during execution of the contract etc., and/or on other grounds as mentioned in IGGL's "Procedure for action in case Corrupt/Fraudulent/Collusive/Coercive Practices" (Annexure-I to Section-III), the contractor/bidder shall be banned (in terms of aforesaid procedure) from the date of issuance of such order by Indradhanush Gas Grid Limited, to such Contractors/Bidders.

The Contractor/ Bidder understands and agrees that in such cases where Contractor/ Bidder has been banned (in terms of aforesaid procedure) from the date of issuance of such order by Indradhanush Gas Grid Limited, such decision of Indradhanush Gas Grid Limited shall be final and binding on such Contractor/ Bidder and the 'Arbitration clause' in the GCC and other "CONTRACT DOCUMENTS" shall not be applicable for any consequential issue /dispute arising in the matter.

40 Public Procurement Policy For Micro And Small Enterprises

The Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 is not applicable for tender for procurement of Works.

MSE bidders need to submit EMD/Bid Security as per relevant clauses of tender (cl. 16 of ITB, etc), failing which bid shall be treated as 'Bid not accompanied with EMD' and shall be rejected. Exemption of EMD and benefits of purchase preference

is not applicable to participating MSE's being a works tender.

41 AHR ITEMS

In item rate contract where the quoted rates for the items exceed 50% of the estimate rates, such items will be considered as Abnormally High Rates (AHR) items and payment of AHR items beyond the SOR stipulated quantities shall be made at the lowest amongst the following rates:

I) Rates as per SOR, quoted by the Contractor.

II) Rate of the item, which shall be derived as follows:

a. Based on rates of Machine and labour as available from the contract (which includes contractor's supervision, profit, overheads and other expenses).

b. In case rates are not available in the contract, rates will be calculated based on prevailing market rates of machine, material and labour plus 15% to cover contractor's supervision profit, overhead & other expenses.

42 VENDOR PERFORMANCE EVALUATION

Shall be as stipulated Annexure II to ITB herewith.

43 INCOME TAX & CORPORATE TAX

43.1 Income tax deduction shall be made from all payments made to the contractor as per the rules and regulations in force and in accordance with the Income Tax Act prevailing from time to time.

43.2 Corporate Tax liability, if any, shall be to the contractor's account.

43.3 **TDS**

(i) TDS, wherever applicable, shall be deducted as per applicable act/law/rule.

(ii) **Higher rate of TDS for non-filers of ITR**

As per Section 206AB of Income Tax Act, 1961, in case of any vendor/customer who does not filed their Income Tax Return for both of the two previous years preceding to current year and aggregate amount of TDS is more than or equal to 50,000/- in each of those previous two years (or limit defined by Govt. from time to time), then TDS will be deducted at the higher of following rates:

(I) Twice the rate mentioned in relevant TDS section.

(II) Twice the rate or rates in force

(III) 5%

43.4 **MENTIONING OF PAN NO. IN INVOICE/BILL**

As per CBDT Notification No. 95/2015 dated 30.12.2015, mentioning of PAN no. is mandatory for procurement of goods / services/works/consultancy services exceeding Rs. 2 Lacs per transaction or as amended from time to time.

Accordingly, contractor should mention their PAN no. in their invoice/ bill for any transaction exceeding Rs. 2 lakhsor as amended from time to time. As provided in the notification, in case contractor do not have PAN no., they have to submit declaration in Form 60 along with invoice/ bill for each transaction.

Payment of contractor shall be processed only after fulfilment of above requirement

44 DISPUTE RESOLUTION MECHANISM

44.1 QUARTERLY CLOSURE OF THE CONTRACT

During execution of orders, various issues may arise. In order to timely detect and to address the contractual issue(s) during the execution of contracts, IGGL has introduced a mechanism of Quarterly Closure of the contract, under which all the related issues /disputes will be monitored and addressed on quarterly basis for resolution. Vendor (hereinafter referred 'Vendor')should first refer any issues/disputes to Engineer-in-Charge(EIC) for LOA/contracts/ Dealing C&P Executive for Purchase Orders and co-operate them for smooth execution of the contract and to timely address the issues, if any. For applicability of 'Quarterly Closure', please refer BDS.

44.2 CONCILIATION AND ARBITRATION

1.0 CONCILIATION

Indradhanush Gas Grid Limited (IGGL) has framed the Conciliation Rules 2019 in conformity with Part – III of the Arbitration and Conciliation Act 1996 as amended from time to time for speedier, cost effective and amicable settlement of disputes through conciliation. All issue(s)/dispute(s) arising under the Contract, which cannot be mutually resolved within a reasonable time, may be referred for conciliation in accordance with IGGL Conciliation Rules 2019 as amended from time to time. A copy of the said rules have been made available on IGGL's web site i.e. https://iggl.co.in.

Where invitation for Conciliation has been accepted by the other party, the Parties shall attempt to settle such dispute(s) amicably under Part-III of the Arbitration and Conciliation Act, 1996 and Indradhanush Gas Grid Limited (IGGL) Conciliation Rules, 2019. It would be only after exhausting the option of Conciliation as an Alternate Dispute Resolution Mechanism that the Parties hereto shall invoke Arbitration Clause. For the purpose of this clause, the option of 'Conciliation' shall be deemed to have been exhausted, even in case of rejection of 'Conciliation' by any of the Parties

2.0 ARBITRATION

All issue(s)/dispute(s) excluding the matters that have been specified as excepted matters and listed at clause no. 2.6 and which cannot be resolved through Conciliation, such issue(s)/dispute(s) shall be referred to arbitration for adjudication by Sole Arbitrator.

The party invoking the Arbitration shall have the option to either opt for Ad-hoc Arbitration as provided at Clause 2.1 below or Institutionalized Arbitration as provided at Clause 2.2 below, the remaining clauses from 2.3 to 2.7 shall apply to both Ad-hoc and Institutional Arbitration:-

2.1 On invocation of the Arbitration clause by either party, IGGL shall suggest a panel of three independent and distinguished persons (Retd Supreme Court & High Court Judges only) to the other party from the Panel of Arbitrators maintained by 'Delhi International Arbitration Centre (DIAC) to select any one among them to act as the Sole Arbitrator. In the event of failure of the other party to select the Sole Arbitrator within 30 days from the receipt of the communication from IGGL suggesting the panel of arbitrators, the right of selection of the sole arbitrator by the other party shall stand forfeited and IGGL shall appoint the Sole Arbitrator from the suggested panel of three

Arbitrators for adjudication of dispute(s). The decision of IGGL on the appointment of the sole arbitrator shall be final and binding on the other party. The fees payable to Sole Arbitrator shall be governed by the fee Schedule of ''Delhi International Arbitration Centre'.

OR

2.2 If a dispute arises out of or in connection with this contract, the party invoking the Arbitration shall submit that dispute to any one of the Arbitral Institutions i.e. ICADR/ICA/DIAC/SFCA and that dispute shall be adjudicated in accordance with their respective Arbitration Rules. The matter shall be adjudicated by a Sole Arbitrator who shall necessarily be a Retd. Supreme Court/High Court Judge to be appointed/nominated by the respective institution. The cost/expenses pertaining to the said Arbitration shall also be governed in accordance with the Rules of the respective Arbitral Institution. The decision of the party invoking the Arbitration for reference of dispute to a specific Arbitral institution for adjudication of that dispute shall be final and binding on both the parties and shall not be subject to any change thereafter. The institution once selected at the time of invocation of dispute shall remain unchanged.

2.3 The cost of arbitration proceedings shall be shared equally by the parties.

2.4 The Arbitration proceedings shall be in English language and the seat, venue and place of Arbitration shall be Guwahati, Assam, India only.

2.5 Subject to the above, the provisions of Arbitration & Conciliation Act 1996 and any amendment thereof shall be applicable. All matter relating to this Contract and arising out of invocation of Arbitration clause are subject to the exclusive jurisdiction of the Court(s) situated at Guwahati, Assam, India.

2.6 **List of Excepted matters**:

a) Dispute(s)/issue(s) involving claims below Rs 25 lakhs and above Rs 10 crores.

b) Dispute(s)/issue(s) relating to indulgence of Supplier/Vendor/Bidder in corrupt/fraudulent/collusive/coercive practices and/or the same is under investigation by CBI or Vigilance or any other investigating agency or Government.

c) Dispute(s)/issue(s) wherein the decision of Engineer-In-Charge/owner/IGGL has been made final and binding in terms of the Contract.

2.7 Disputes involving claims below Rs 25 Lakhs and above Rs. 10 crores:- Parties mutually agree that dispute(s)/issue(s) involving claims below Rs 25 Lakhs and above Rs 10 crores shall not be subject matter of Arbitration and are subject to the exclusive jurisdiction of the Court(s) situated at Guwahati, Assam, India.

3.0 **GOVERNING LAW AND JURISDICTION:**

The Contract shall be governed by and construed in accordance with the laws in force in India. The Parties hereby submit to the exclusive jurisdiction of the Courts situated at Guwahati, Assam, India for adjudication of disputes, injunctive reliefs, actions and proceedings, if any, arising out of this Contract.

45. DISPUTES BETWEEN CPSE'S / GOVERNMENT DEPARTMENT'S/

ORGANIZATIONS

Subject to conciliation as provided above, in the event of any dispute (other than those related to taxation matters) or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs/ Port Trusts inter-se and also between CPSEs and Government Departments /Organizations), such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in OPE OM No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22-05-2018.

Any party aggrieved with the decision of the Committee at the First level (tier) may prefer an appeal before the Cabinet Secretary at the Second level (tier) within 15 days from the date of receipt of decision of the Committee at First level, through it's administrative Ministry/Department, whose decision will be final and binding on all concerned.

The above provisions mentioned at clause no. 44.2 to 44.3 & 45 supersede provisions relating to Conciliation, Arbitration, Governing Law & Jurisdiction and Disputes between CPSE's/ Government Department's/ Organizations mentioned in General Conditions of Contract (GCC) and elsewhere in tender document

46.0 INAM-PRO (PLATFORM FOR INFRASTRUCTURE AND MATERIALS PROVIDERS)

INAM-Pro (Platform for infrastructure and materials providers) is a web based platform for infrastructure provides and materials suppliers and was developed by Ministry of Road Transport and Highways (MoRT&H) with a view to reduce project execution delays on account of supply shortages and inspire greater confidence in contractors to procure cement to start with directly from the manufacturers. Presently, numerous cement companies are registered in the portal and offering cement for sale on the portal with a commitment period of 3 years. These companies have bound themselves by ceiling rates for the entire commitment period, wherein they are allowed to reduce or increase their cement rates any number of times within the ceiling rate, but are not permitted to exceed the said ceiling rate.
MoRT&H is expanding the reach of this web-portal by increasing both the product width as well as the product depth. They are working on incorporating 60 plus product categories. The product range will span from large machineries like Earth Movers and Concrete Mixers, to even the smallest items like road studs. MoRT&H intend to turn it into a portal which services every infrastructure development related need of a modern contractor.
IGGL's contractors may use this innovative platform, wherever applicable. The usage of web – Portal is a completely voluntary exercise. The platform, however, can serve as a benchmark for comparison of offered prices and products.

47 PROMOTION OF PAYMENT THROUGH CARDS AND DIGITAL MEANS

To promote cashless transactions, the onward payments by Contractors to their employees, service providers, sub-contractors and suppliers may be made through Cards and Digital means to the extent possible

48 CONTRACTOR TO ENGAGE CONTRACT MANPOWER BELONGING TO SCHEDULED CASTES AND WEAKER SECTIONS OF THE SOCIETY

While engaging the contractual manpower, Contractors are required to make efforts to provide opportunity of employment to the people belonging to Scheduled Castes and weaker sections of the society also in order to have a fair representation of these sections.

49. PROVISIONS FOR STARTUPS (AS DEFINED IN GAZETTE NOTIFICATION NO. D.L-33004/99 DATED 18.02.2016 AND 23.05.2017 OF MINISTRY OF COMMERCE AND INDUSTRY AND AS AMENDED FROM TIME TO TIME)

Not Applicable

50. PROVISION REGARDING INVOICE FOR REDUCED VALUE OR CREDIT NOTE TOWARDS PRS

PRS is the reduction in the consideration / contract value for the services covered under this contract. In case of delay in execution of contract, service provider should raise invoice for reduced value as per Price Reduction Schedule Clause (PRS clause). If service provider has raised the invoice for full value, then service provider should issue Credit Note towards the applicable PRS amount with applicable taxes.
In such cases if service provider fails to submit the invoice with reduced value or does not issue credit note as mentioned above, IGGL will release the payment to service provider after giving effect of the PRS clause with corresponding reduction of taxes charged on service provider's invoice, to avoid delay in payment.
In case any financial implication arises on IGGL due to issuance of invoice without reduction in price or non-issuance of Credit Note, the same shall be to the account of service provider. IGGL shall be entitled to deduct / setoff / recover such GST amount (CGST & SGST/UTGST or IGST) together with penalties and interest, if any, against any amounts paid or becomes payable by IGGL in future to the service provider under this contract or under any other contract.

51. UNIQUE DOCUMENT IDENTIFICATION NUMBER BY PRACTICING CHARTERED ACCOUNTANTS

Practicing Chartered Accountants shall generate Unique Document Identification Number (UDIN) for all certificates issued by them as per provisions of Tender Document.
However, UDIN may not be required for documents being attested by Chartered Accountants in terms of provisions of Tender Document.

52. DOCUMENTS FOR PAYMENT:

Payment terms shall be as mentioned in GCC-Works/SCC.
However, for release of payment, Contractor is required to submit invoice along with other documents as mentioned in SCC. The final bill is to be submitted within one month after completion.
Further, IGGL is in process of implementing Vendor Invoice Management (VIM). After implementation of same (to be communicated separately), Contractor/ Vendor to forward the invoice on VIM Collection Center or upload digital invoice on Portal (details of same will be provided separately). The copy of invoice and all other document mentioned above or in order/ contract is to be forwarded to address provided in order/contract.

53. VOID

54. SUB-LETTING OF WORKS

The following is added to the Clause no. 37 of General Conditions of Contract (GCC)-Works:

(i) Procurement of material, hire of equipment or engagement of labour will not mean sub-contracting.

(ii) Sub-contracting by the contractor without the approval of IGGL shall be a breach of contract, unless explicitly permitted in the contract.

(iii) However, If specified in SCC Sub-contracting for Specialized Items of Work is allowed upto certain percentage of work.

However, subletting of WHOLE WORKS is prohibited. An undertaking to this effect will be given by Vendor / Contractor along with each invoice / bill.

PROCEDURE FOR ACTION IN CASE CORRUPT/FRAUDULENT/COLLUSIVE/COERCIVE PRACTICES

A Definitions:

A.1 "Corrupt Practice" means the offering, giving, receiving or soliciting, directly or indirectly, anything of value to improperly influence the actions in selection process or in contract execution.
"Corrupt Practice" also includes any omission for misrepresentation that may mislead or attempt to mislead so that financial or other benefit may be obtained or an obligation avoided.

A2 "Fraudulent Practice" means and include any act or omission committed by a agency or with his connivance or by his agent by misrepresenting/ submitting false documents and/ or false information or concealment of facts or to deceive in order to influence a selection process or during execution of contract/ order.

A3 "Collusive Practice amongst bidders (prior to or after bid submission)" means a scheme or arrangement designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.

A.4 "Coercive practice" means impairing or harming or threatening to impair or harm directly or indirectly, any agency or its property to influence the improperly actions of an agency, obstruction of any investigation or auditing of a procurement process.

A.5 "Vendor/Supplier/Contractor/Consultant/Bidder" is herein after referred as "Agency"

A.6 "Appellate Authority" shall mean Committee of Directors consisting of Director (Finance) and Director (BD) for works centers under Director (Projects). For all other cases committee of Directors shall consist of Director (Finance) & Director (Projects).

A.7 "Competent Authority" shall mean the authority, who is competent to take final decision for Suspension of business dealing with an Agency/ (ies) and Banning of business dealings with Agency/ (ies) and shall be the "Director" concerned.

A.8 "Allied Agency" shall mean all concerns which come within the sphere of effective influence of the banned/suspended agency shall be treated as allied agency. In determining this, the following factors may be taken into consideration:

a) Whether the management is common;
b) Majority interest in the management is held by the partners or directors of banned/ suspended agency;
c) Substantial or majority shares are owned by the banned/ suspended agency and by virtue of this it has a controlling voice.
d) Directly or indirectly controls, or is controlled by or is under common control with another bidder.
e) All successor agency will also be considered as allied agency.

A.9 "Investigating Agency" shall mean any department or unit of IGGL investigating into the conduct of Agency/ party and shall include the Vigilance Department of the IGGL, Central Bureau of Investigation, State Police or any other agency set up by the Central or state government having power to investigate.

A.10 "Obstructive practice": materially impede the procuring entity's investigation into allegations of one or more of the above mentioned practices either by deliberately destroying, falsifying, altering; or by concealing of evidence material to the investigation; or by making false statements to investigators and/ or by threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or by impeding IGGL's rights of audit or access to information.

B Actions against bidder(s) indulging in corrupt /fraudulent/ collusive/ coercive practice

B.1 Irregularities noticed during the evaluation of the bids :

If it is observed during bidding process/ bids evaluation stage that a bidder has indulged in corrupt/fraudulent /collusive/coercive practice, the bid of such Bidder (s) shall be rejected and its Earnest Money Deposit (EMD) shall be forfeited.
Further, such agency shall be banned for future business with IGGL for a period specified in para B 2.2 below from the date of issue of banning order.

B.2 Irregularities noticed after award of contract

(i) **During execution of contract:**
If an agency, is found to have indulged in corrupt/fraudulent/ collusive/coercive practices, action shall be initiated for putting the agency on banning list.

After conclusion of process and issuance of Speaking order for putting party on banning list, the order (s)/ contract (s) where it is concluded that such irregularities have been committed shall be terminated and Contract cum Performance Bank Guarantee (CPBG) submitted by agency against such order (s)/ contract (s) shall also be forfeited. Further such order/ contract will be closed following the due procedure in this regard.

The amount that may have become due to the contractor on account of work already executed by him shall be payable to the contractor and this amount shall be subject to adjustment against any amounts due from the contractor under the terms of the contract. No risk and cost provision will be enforced in such cases.

Suspension of order/ contract:

Further, only in the following situations, the concerned order (s)/ contract(s) (where Corrupt/Fraudulent/ Collusive/ Coercive Practices are observed) and payment shall be suspended after issuance of Suspension cum Show Cause Notice:

(i) Head of Corporate Vigilance Department/CVO based on the investigation by them, recommend for specific immediate action against the agency.
(ii) Head of Corporate Vigilance Department/CVO based on the input from investigating agency, forward for specific immediate action against the agency.

Suspension cum Show Cause Notice being issued in above cases after approval of the competent authority (as per provisions mentioned under Clause no. D) shall also include the provision for suspension of Order (s)/ Contract (s) and payment. Accordingly, after issuance of Suspension cum Show Cause Notice, the formal communication for suspension of Order (s)/ Contract (s) and payment with immediate effect will be issued by the concerned person of IGGL.

During suspension, Contractor/ Service Providers will be allowed to visit the plant/ site for upkeep of their items/ equipment, IGGL's issued materials (in case custody of same is not taken over), demobilizing the site on confirmation of EIC, etc.

In addition to above, Recovery of payments (other than due payments) including balance advance payments, if any, made by along with interest thereon at the prevailing rate shall be recovered.

(ii) After execution of contract and during Defect liability period (DLP)/ Warranty/Guarantee Period:

If an agency is found to have indulged in corrupt/fraudulent/ collusive/coercive practices, after execution of contract and during DLP/ Warranty/Guarantee Period, the agency shall be banned for future business with IGGL for a period specified in para B 2.2 below from the date of issue of banning order.
Further, the Contract cum Performance Bank Guarantee (CPBG)/Contract Performance Security (CPS) submitted by agency against such order (s)/ contract (s) shall be forfeited.

(iii) After expiry of Defect liability period (DLP)/ Warranty/Guarantee Period

If an agency is found to have indulged in corrupt/fraudulent/ collusive/coercive practices, after expiry of Defect liability period (DLP)/ Warranty/Guarantee Period, the agency shall be banned for future business with IGGL for a period specified in para B 2.2 below from the date of issue of banning order.

B.2.2 Period of Banning

The period of banning of agencies indulged in Corrupt/Fraudulent/Collusive/Coercive Practices shall be as under and to be reckoned from the date of banning order:

S. No.	Description	Period of banning from the date of issuance of Banning order
1	Misrepresentation/False information other than pertaining to BEC of tender but having impact on the selection process. For example, if an agency confirms not being in holiday in IGGL/PSU's PMC or banned by PSUs/ Govt. Dept., liquidation, bankruptcy & etc. and subsequently it is found otherwise, such acts shall be considered in this category.	06 Months
2	Corrupt/Fraudulent (except mentioned sl. no. 1 above) /Collusive/Coercive Practices	01 year
2.1	If an agency again commits Corrupt/Fraudulent (except mentioned sl. no. 1 above) /Collusive/ Coercive Practices in subsequent cases after their banning, such situation of repeated offense to be dealt with more severity	2 years (in addition to the period already served)
3	Indulged in unauthorized disposal of materials provided by IGGL	2 years
4	If act of vendor/ contractor is a threat to the National Security	2 years

C Effect of banning on other ongoing contracts/ tenders

C.1 If an agency is put on Banning, such agency should not be considered in ongoing tenders/future tenders.

C.2 However, if such an agency is already executing other order (s)/ contract (s) where no corrupt/fraudulent/ collusive/coercive practice is found, the agency should be allowed to continue till its completion without any further increase in scope except those incidental to original scope mentioned in the contract.

C.3 If an agency is put on the Banning List during tendering and no irregularity is found in the case under process:

C.3.1 after issue of the enquiry /bid/tender but before opening of Technical bid, the bid submitted by the agency shall be ignored.

C.3.2 after opening Technical bid but before opening the Price bid, the Price bid of the agency shall not be opened and BG/EMD submitted by the agency shall be returned to the agency.

C.3.3 after opening of price, BG/EMD made by the agency shall be returned; the offer of the agency shall be ignored & will not be further evaluated. .In case such agency is lowest (L-1), next lowest bidder shall be considered as L-1..

D. Procedure for Suspension of Bidder

D.1 Initiation of Suspension

Action for suspension business dealing with any agency/(ies) shall be initiated by Corporate C&P Department when

(i) Corporate Vigilance Department based on the fact of the case gathered during investigation by them recommend for specific immediate action against the agency.

(ii) Corporate Vigilance Department based on the input from Investigating agency, forward for specific immediate action against the agency.

(iii) Non performance of Vendor/Supplier/Contractor/Consultant leading to termination of Contract/ Order.

D.2 Suspension Procedure:

D.2.1 The order of suspension would operate initially for a period not more than six months and is to be communicated to the agency and also to Corporate Vigilance Department. Period of suspension can be extended with the approval of the Competent Authority by one month at a time with a ceiling of six months pending a conclusive decision to put the agency on banning list.

D.2.2 During the period of suspension, no new business dealing may be held with the agency.

D.2.3 Period of suspension shall be accounted for in the final order passed for banning of business with the agency.

D.2.4 The decision regarding suspension of business dealings should also be communicated to the agency.

D.2.5 If a prima-facie, case is made out that the agency is guilty on the grounds which can result in banning of business dealings, proposal for issuance of suspension order and show cause notice shall be put up to the Competent Authority. The suspension order and show cause notice must include that (i) the agency is put on suspension list and (ii) why action should not be taken for banning the agency for future business from IGGL.

The competent authority to approve the suspension will be same as that for according approval for banning.

D 3 Effect of Suspension of business:

Effect of suspension on other on-going/future tenders will be as under:

D.3.1 No enquiry/bid/tender shall be entertained from an agency as long as the name of agency appears in the Suspension List.

D.3.2 If an agency is put on the Suspension List during tendering:

D.3.2.1 after issue of the enquiry /bid/tender but before opening of Technical bid, the bid submitted by the agency shall be ignored.

D.3.2.2 after opening Technical bid but before opening the Price bid, the Price bid of the agency shall not be opened and BG/EMD submitted by the agency shall be returned to the agency.

D.3.2.3 after opening of price, BG/EMD made by the agency shall be returned; the offer of the agency shall be ignored & will not be further evaluated. In case such agency is lowest (L-1), next lowest bidder shall be considered as L-1. .

D.3.3 The existing contract (s)/ order (s) under execution shall continue.

D.3.4 Tenders invited for procurement of goods, works and services shall have provision that the bidder shall submit a undertaking to the effect that (i) neither the bidder themselves nor their allied agency/(ies) are on banning list of IGGL or the Ministry of Petroleum and Natural Gas and (ii) bidder is not banned by any Government department/ Public Sector.

F. Appeal against the Decision of the Competent Authority:

F.1 The agency may file an appeal against the order of the Competent Authority for putting the agency on banning list. The appeal shall be filed to Appellate Authority. Such an appeal shall be preferred within one month from the of receipt of banning order.

F.2 Appellate Authority would consider the appeal and pass appropriate order which shall be communicated to the party as well as the Competent Authority.

F.3 Appeal process may be completed within 45 days of filing of appeal with the Appellate Authority.

G. Wherever there is contradiction with respect to terms of 'Integrity pact' , GCC and 'Procedure for action in case of Corrupt/Fraudulent/ Collusive/Coercive Practice', the provisions of 'Procedure for action in case of Corrupt/Fraudulent/ Collusive/Coercive Practice' shall prevail.

PROCEDURE FOR EVALUATION OF PERFORMANCE OF VENDORS/ SUPPLIERS/ CONTRACTORS/ CONSULTANTS

1.0 GENERAL

A system for evaluation of Vendors/ Suppliers/Contractors/ Consultants and their performance is a key process and important to support an effective purchasing & contracting function of an organization.
Performance of all participating Vendors/ Suppliers/Contractors/ Consultants need to be closely monitored to ensure timely receipt of supplies from a Vendor, completion of an assignment by a Consultant or complete execution of order by a contractor within scheduled completion period. For timely execution of projects and meeting the operation & maintenance requirement of operating plants, it is necessary to monitor the execution of order or contracts right from the award stage to completion stage and take corrective measures in time.

2.0 OBJECTIVE

The objective of Evaluation of Performance aims to recognize, and develop reliable Vendors/ Suppliers/Contractors/ Consultants so that they consistently meet or exceed expectations and requirements.
The purpose of this procedure is to put in place a system to monitor performance of Vendors/ Suppliers/Contractors/ Consultants associated with IGGL so as to ensure timely completion of various projects, timely receipt of supplies including completion of works & services for operation and maintenance of operating plants and quality standards in all respects.

3.0 METHODOLOGY

i) Preparation of Performance Rating Data Sheet
Performance rating data Sheet for each and every Vendor/ Supplier/Contractor/Consultant for all orders/Contracts with a value of Rs. 50 Lakhs and above is recommended to be drawn up. Further, Performance rating data Sheet for orders/contracts of Vendor/Supplier/Contractor/ Consultant who are on watch list/holiday list/ banning list shall be prepared irrespective of order/ contract value. These data sheets are to be separately prepared for orders/ contracts related to Projects and O&M. Format, Parameters, Process, responsibility for preparation of Performance Rating Data Sheet are separately mentioned.

ii) Measurement of Performance
Based on the parameters defined in Data Sheet, Performance of concerned Vendor/ Supplier/Contractor/ Consultant would be computed and graded accordingly. The measurement of the performance of the Party would be its ability to achieve the minimum scoring of 60% points in the given parameters.

iii) Initiation of Measures:
Depending upon the Grading of Performance, corrective measures would be initiated by taking up the matter with concerned Vendor/ Supplier/Contractor/ Consultant. Response of Vendor/ Supplier/Contractor/ Consultant would be considered before deciding further course of action.

iv) Implementation of Corrective Measures:
Based on the response of Vendor/ Supplier/Contractor/ Consultant, concerned Engineer-in-Charge for the Projects and/or OIC in case of O&M would recommend for continuation or discontinuation of such party from the business of IGGL.

v) Orders/contracts placed on Proprietary/OEM basis for O&M will be evaluated and, if required, corrective action will be taken for improvement in future.

4.0 EXCLUSIONS:

The following would be excluded from the scope of evaluation of performance of Vendors/ Suppliers/Contractors/ Consultants :

i) Orders/Contracts below the value of Rs. 50 Lakhs if Vendor/ Supplier/Contractor/ Consultant is not on watch list/ holiday list/ banning list.

ii) Orders for Misc./Administrative items/ Non stock Non valuated items (PO with material code ending with 9).

However, concerned Engineer-in-Charge /OICs will continue to monitor such cases so as to minimize the

impact on Projects/O&M plants due to non performance of Vendors/ Suppliers/Contractors/ Consultants in all such cases.

5.0 PROCESS OF EVALUATION OF PERFORMANCE OF VENDORS/ SUPPLIERS/ CONTRACTORS/ CONSULTANTS

5.1 FOR PROJECTS

i) Evaluation of performance of Vendors/ Suppliers/Contractors/ Consultants in case of PROJECTS shall be done immediately with commissioning of any Project.

ii) On commissioning of any Project, EIC (Engineer-in-charge)/ Project-in-charge shall prepare a Performance Rating Data Sheet (Format at Annexure-1) for all Orders and Contracts.

iii) Depending upon the Performance Rating, following action shall be initiated by Engineer-in-charge/Project-in-charge:

Sl.No.	Performance Rating	Action
1	POOR	Seek explanation for Poor performance
2	FAIR	Seek explanation for Fair performance
3	GOOD	Letter to the concerned for improving performance in future
4	VERY GOOD	No further action

iv) Reply from concerned Vendor/ Supplier/Contractor/ Consultant shall be examined. In case of satisfactory reply, Performance Rating data Sheet to be closed with a letter to the concerned for improving performance in future.

v) When no reply is received or reasons indicated are unsatisfactory, the following actions need to be taken:

A) Where performance rating is "POOR" (as per Performance Rating carried out after execution of Order/ Contract and where no reply/ unsatisfactory reply is received from party against the letter seeking the explanation from Vendor/Supplier/Contractor/ Consultant along with sharing the performance rating)

Recommend such defaulting Vendor / Supplier / Contractor / Consultant for the following action:

1. Poor Performance on account of Quality (if marks obtained against Quality parameter is less than 20):
   - **(a) First Instance: Holiday (Red Card) for OneYear**
   - **(b) Subsequent instance (s) in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: Holiday (Red Card) for Two Years**

2. Poor Performance on account of other than Quality (if marks obtained against Quality parameter is more than 20):
   - (a) **First such instance: Advisory notice(Yellow Card)** shall be issued and Vendor/Supplier/Contractor/ Consultant shall be put on watch list for a period of Two(2) Years.
   - **(b) Second such instance in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (Red Card) for a period of One Year**
   - **(c) Subsequent instances (more than two) in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (Red Card) for a period of Two Years.**

B) Where Poor/Non-Performance leading to termination of contract or Offloading of contract due to poor performance attributable to Vendor/Supplier/ Contractor/Consultant (under clause no. 32 (C) of GCC-Works)

(a) **First instance**: **Advisory notice (Yellow Card)** shall be issued and Vendor/Supplier/Contractor /Consultant shall be put on watch list for a period of Two(2) Years.
Further such vendor will not be allowed to participate in the re-tender of the same supply/work/services of that location which has terminated / offloaded. Moreover, it will be ensured that all other action as per provision of contract including forfeiture of Contract Performance Security (CPS) etc. are undertaken. However, such vendor will be allowed to participate in all other tenders and to execute other ongoing order/ contract (s) or new contract/ order (s).
The Yellow card will be automatically revoked after a period of twoyears unless the same is converted into Red Card due to subsequence instances of poor/ non-performance in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant.

(b) **Second instances** in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: **Holiday (Red Card)** for period of One Year and they shall also to be considered for Suspension.

(c) **Subsequent instances (more than two)** in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: **Holiday (Red Card) for period of Two Years and they shall also to be considered for Suspension.**

(C) Where Performance rating is "FAIR":
Issuance of warning to such defaulting Vendor/ Supplier/Contractor/ Consultant to improve their performance.

5.2 FOR CONSULTANCY JOBS

Monitoring and Evaluation of consultancy jobs will be carried out in the same way as described in para 5.1 for Projects.

5.3 FOR OPERATION & MAINTENANCE

i) Evaluation of performance of Vendors/ Suppliers/Contractors/ Consultants in case of Operation and Maintenance shall be done immediately after execution of order/ contract.

ii) After execution of orders a Performance Rating Data Sheet (Format at Annexure-2) shall be prepared for Orders by Site C&P and for Contracts/Services by respective Engineer-In-Charge.

iii) Depending upon Performance Rating, following action shall be initiated by EIC:

Sl. No.	Performance Rating	Action
1	**POOR**	Seek explanation for Poor performance
2.	**FAIR**	Seek explanation for Fair performance
3	**GOOD**	Letter to the concerned for improving performance in future.
4	**VERY GOOD**	No further action

iv) Reply from concerned Vendor/ Supplier/Contractor/ Consultant shall be examined. In case of satisfactory reply, Performance Rating data Sheet to be closed with a letter to the concerned for improving performance in future.

v) When no reply is received or reasons indicated are unsatisfactory, the following actions need to be taken:

A) Where performance rating is "POOR" (as per Performance Rating carried out after execution of Order/ Contract and where no reply/ unsatisfactory reply is received from party against the letter seeking the explanation from Vendor/Supplier/Contractor/ Consultant along with sharing the performance rating)
Recommend such defaulting Vendor / Supplier / Contractor / Consultant for the following

action:

1. Poor Performance on account of Quality (if marks obtained against Quality parameter is less than 20):
   - **(a) First Instance: Holiday (Red Card) for One Year**
   - **(b) Subsequent instance (s) in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: Holiday (Red Card) for Two Years**

2. Poor Performance on account of other than Quality (if marks obtained against Quality parameter is more than 20):
   - **(a) First such instance: Advisory notice(Yellow Card)** shall be issued and Vendor/Supplier/Contractor/ Consultant shall be put on watch list for a period of Two(2) Years.
   - **(b) Second such instance in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (Red Card) for a period of One Year**
   - **(c) Subsequent instances (more than two) in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: Putting on Holiday (Red Card) for a period of Two Years.**

B) Where Poor/Non-Performance leading to termination of contract or Offloading of contract due to poor performance attributable to Vendor/Supplier/ Contractor/Consultant (under clause no. 32 (C) of GCC-Works)

(a) First instance: **Advisory notice (Yellow Card)** shall be issued and Vendor/Supplier/Contractor /Consultant shall be put on watch list for a period of Two(2) Years.

Further such vendor will not be allowed to participate in the re-tender of the same supply/work/services of that location which has terminated / offloaded. Moreover, it will be ensured that all other action as per provision of contract including forfeiture of Contract Performance Security (CPS) etc. are undertaken. However, such vendor will be allowed to participate in all other tenders and to execute other ongoing order/ contract (s) or new contract/ order (s).

The Yellow card will be automatically revoked after a period of two years unless the same is converted into Red Card due to subsequence instances of poor/ non-performance in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant.

(b) **Second instances** in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: **Holiday (Red Card)** for period of One Year and they shall also to be considered for Suspension.

(c) **Subsequent instances (more than two)** in other ongoing order (s)/ contract (s) or new order (s) /contact (s) on such Vendor/ Supplier/ Contractor/ Consultant: **Holiday (Red Card) for period of Two Years and they shall also to be considered for Suspension.**

(C) Where Performance rating is "FAIR"

Issuance of warning to such defaulting Vendors/Contractors/Consultants to improve their performance.

6.0 REVIEW & RESTORATION OF PARITES PUT ON HOLIDAY

6.1 An order for Holiday passed for a certain specified period shall deemed to have been automatically revoked on the expiry of that specified period and it will not be necessary to issue a specific formal order of revocation.

Further, in case Vendor/ Supplier/Contractor/ Consultant is put on holiday due to quality, and new order is placed on bidder after restoration of Vendor/ Supplier/Contractor/ Consultant, such order will be properly monitored during execution stage by the concerned site.

7.0 EFFECT OF HOLIDAY

7.1 If a Vendor/ Supplier/Contractor/ Consultant is put on Holiday, such Vendor/ Supplier/Contractor/ Consultant shall not be considered in ongoing tenders/future tenders.

7.2 However, if such Vendor/ Supplier/Contractor/ Consultant is already executing any other order/ contract and their performance is satisfactory in terms of the relevant contract, should be allowed to continue till its completion without any further increase in scope except those incidental to original scope mentioned in the contract. In such a case CPBG will not be forfeited and payment will be made as per provisions of concerned contract. However, this would be without prejudice to other terms and conditions of the contract.

7.3. Effect on other ongoing tendering:

7.3.1 after issue of the enquiry /bid/tender but before opening of Technical bid, the bid submitted by the party shall be ignored.

7.3.2 after opening Technical bid but before opening the Price bid, the Price bid of the party shall not be opened and BG/EMD submitted by the party shall be returned to the party.

7.3.3 after opening of price, BG/EMD made by the party shall be returned; the offer of the party shall be ignored & will not be further evaluated. In case such agency is lowest (L-1), next lowest bidder shall be considered as L-1..

8.0 While putting the Vendor/ Supplier/Contractor/ Consultant on holiday as per the procedure, the holding company, subsidiary, joint venture, sister concerns, group division of the errant Vendor/ Supplier/Contractor/ Consultant shall not be considered for putting on holiday list.

Any bidder, put on holiday, will not be allowed to bid through consortium route also in new tender during the period of holiday.

9.0 If an unsuccessful bidder makes any vexatious, frivolous or malicious complaint against the tender process with the intention of delaying or defeating any procurement or causing loss to IGGL or any other bidder, such bidder will be put on holiday for a period of six months, if such complaint is proved to be vexatious, frivolous or malicious, after following the due procedure.

10. APPEAL AGAINST THE DECISION OF THE COMPETENT AUTHORITY:

(a) The party may file an appeal against the order of the Competent Authority for putting the party on Holiday list. The appeal shall be filed to Appellate Authority. Such an appeal shall be preferred within one month from the of receipt of Holiday order.

(b) Appellate Authority would consider the appeal and pass appropriate order which shall be communicated to the party as well as the Competent Authority.

(c) Appeal process may be completed within 45 days of filing of appeal with the Appellate Authority.

(d) "Appellate Authority" shall mean Committee of Directors consisting of Director (Finance) and Director (BD) for works centers under Director (Projects). For all other cases committee of Directors shall consist of Director (Finance) & Director (Projects).

11. **ERRANT BIDDER**

In case after price bid opening the lowest evaluated bidder (L1) is not awarded the job for any mistake committed by him in bidding or withdrawal of bid or modification of bid or varying any term in regard thereof leading to re-tendering, IGGL shall forfeit EMD if paid by the bidder and such bidders shall be debarred from participation in retendering of the same job(s)/item(s).

Further, such bidder will be put on Watch List (Yellow Card) for a period of two years after following the due procedure. However, during the period in watch list such vendor will be allowed to participate in all other tenders and to execute other ongoing order/ contract (s) or new contract/ order (s).

In case of subsequent instances of default in other tender(s) during aforesaid watch list period, the action shall be initiated as per provision of sl. no. 2 of para A of Clause no. 5.1 (v) and 5.3 (v).

The Yellow card will be automatically revoked after specified period unless the same is converted into Red Card

12. In case CBIC (Central Board of Indirect Taxes and Customs)/ any tax authority / any equivalent government agency brings to the notice of IGGL that the Supplier has not remitted the amount towards GST (CGST & SGST/UTGST or IGST) collected from IGGL to the government exchequer, then, that Supplier shall be put under Holiday list of IGGL for period of six months after following the due procedure. This action will be in addition to the right of recovery of financial implication arising on IGGL.

Annexure-1

Indradhanush Gas Grid Limited
PERFORMANCE RATING DATA SHEET
(FOR PROJECTS/ CONSULTANCY JOBS)

i) Project/Work Centre :
ii) Order/ Contract No. & date :
iii) Brief description of Items Works/Assignment :
iv) Order/Contract value (Rs.) :
v) Name of Vendor/Supplier/ Contractor/ Consultant :
vi) Contracted delivery/ Completion Schedule :
vii) Actual delivery/ Completion date :

Performance Parameter	Delivery/ Completion Performance	Quality Performance	Reliability Performance#	Total
Maximum Marks	40	40	20	100
Marks Allocated				

Note:
Remarks (if any)

PERFORMANCE RATING (**)

Note :
(#) Vendor/Supplier/Contractor/Consultant who seek repeated financial assistance or deviation beyond contract payment term or seeking direct payment to the sub-vendor/sub-contractor due to financial constraints, then '0' marks should be allotted against Reliability Performance.
(*) Allocation of marks should be as per enclosed instructions
(**) Performance rating shall be classified as under :

Sl. No.	Range (Marks)	Rating
1	60 & below	POOR
2	61-75	FAIR
3	76-90	GOOD
4	More than 90	VERY GOOD

Signature of Authorised Signatory:

Name:

Designation:

Instructions for allocation of marks

1. Marks are to be allocated as under :

1.1 DELIVERY/ COMPLETION PERFORMANCE **40 Marks**

Delivery Period/ Completion Schedule	**Delay in Weeks**	**Marks**
a) Upto 3 months	Before CDD	40
	Delay upto 4 weeks	35
	" 8 weeks	30
	" 10 weeks	25
	" 12 weeks	20
	" 16 weeks	15
	More than 16 weeks	0
b) Above 3 months	Before CDD	40
	Delay upto 4 weeks	35

	" 8 weeks	30
	" 10 weeks	25
	" 16 weeks	20
	" 20 weeks	15
	" 24 weeks	10
	More than 24 weeks	0

1.2 QUALITY PERFORMANCE **40 Marks**

For Normal Cases : No Defects/ No Deviation/ No failure:		40 marks
i) Rejection/Defects	Marks to be allocated on prorata basis for acceptable quantity as compared to total quantity for normal cases	10 marks
ii) When quality failure endanger system integration and safety of the system	Failure of severe nature - Moderate nature - low severe nature	0 marks 5 marks 10-25 marks
iii) Number of deviations	1. No deviation 2. No. of deviations $\leq$ 2 3. No. of deviations > 2	5 marks 2 marks 0 marks

1.3 RELIABILITY PERFORMANCE **20 Marks**

A.	**FOR WORKS/CONTRACTS**	
i)	Submission of order acceptance, agreement, PBG, Drawings and other documents within time	4 marks
ii)	Mobilization of resources as per Contract and in time	4 marks
iii)	Liquidation of Check-list points	4 marks
iv)	Compliance to statutory and HS&E requirements or Reliability of Estimates/Design/Drawing etc. in case of Consultancy jobs	4 marks
v)	Timely submission of estimates and other documents for Extra, Substituted & AHR items	4 marks
B.	**FOR SUPPLIES**	
i)	Submission of order acceptance, PBG, Drawings and other documents within time	5 marks
ii)	Attending complaints and requests for after sales service/ warranty repairs and/ or query/ advice (upto the evaluation period).	5 marks
iii)	Response to various correspondence and conformance to standards like ISO	5 marks
iv)	Submission of all required documents including Test Certificates at the time of supply	5 marks

Annexure-2

Indradhanush Gas Grid Limited
PERFORMANCE RATING DATA SHEET
(FOR O&M)

i) Location :
ii) Order/ Contract No. & date :
iii) Brief description of Items Works/Assignment :
iv) Order/Contract value (Rs.) :
v) Name of Vendor/Supplier/ Contractor/ Consultant :
vi) Contracted delivery/ Completion Schedule :
vii) Actual delivery/ Completion date :

Performance Parameter	Delivery Performance	Quality Performance	Reliability Performance#	Total
Maximum Marks	40	40	20	100
Marks Allocated (*)				

Remarks (if any)

PERFORMANCE RATING (**)

Note :

(#) Vendor/Supplier/Contractor/Consultant who seek repeated financial assistance or deviation beyond contract payment term or seeking direct payment to the sub-vendor/sub-contractor due to financial constraints, then '0' marks should be allotted against Reliability Performance

(*) Allocation of marks should be as per enclosed instructions

(**) Performance rating shall be classified as under :

Sl. No.	Range (Marks)	Rating
1	60 & below	POOR
2	61-75	FAIR
3	76-90	GOOD
4	More than 90	VERY GOOD

Signature of Authorised Signatory:

Name:

Designation:

Instructions for allocation of marks (For O&M)

1. Marks are to be allocated as under :

1.1 DELIVERY/ COMPLETION PERFORMANCE **40 Marks**

Delivery Period/ Completion Schedule	**Delay in Weeks**	**Marks**
a) Upto 3 months	Before CDD	40
	Delay upto 4 weeks	35
	" 8 weeks	30
	" 10 weeks	25
	" 12 weeks	20
	" 16 weeks	15
	More than 16 weeks	0
b) Above 3 months	Before CDD	40
	Delay upto 4 weeks	35
	" 8 weeks	30
	" 10 weeks	25
	" 16 weeks	20

	" 20 weeks	15
	" 24 weeks	10
	More than 24 weeks	0

1.2 QUALITY PERFORMANCE **40 Marks**

For Normal Cases : No Defects/ No Deviation/ No failure: 40 marks

i) Rejection/Defects	Marks to be allocated on prorata basis for acceptable quantity as compared to total quantity for normal cases	10 marks
ii) When quality failure endanger system integration and safety of the system	Failure of severe nature - Moderate nature - low severe nature	0 marks 5 marks 10-25 marks
iii) Number of deviations	1. No deviation 2. No. of deviations $\leq$ 2 3. No. of deviations > 2	5 marks 2 marks 0 marks

1.3 RELIABILITY PERFORMANCE **20 Marks**

A.	**FOR WORKS/CONTRACTS**	
i)	Submission of order acceptance, agreement, PBG, Drawings and other documents within time	4 marks
ii)	Mobilization of resources as per Contract and in time	4 marks
iii)	Liquidation of Check-list points	4 marks
iv)	Compliance to statutory and HS&E requirements or Reliability of Estimates/Design/Drawing etc. in case of Consultancy jobs	4 marks
v)	Timely submission of estimates and other documents for Extra, Substituted & AHR items	4 marks
B.	**FOR SUPPLIES**	
i)	Submission of order acceptance, PBG, Drawings and other documents within time	5 marks
ii)	Attending complaints and requests for after sales service/ warranty repairs and/ or query/ advice (upto the evaluation period).	5 marks
iii)	Response to various correspondence and conformance to standards like ISO	5 marks
iv)	Submission of all required documents including Test Certificates at the time of supply	5 marks

Annexure-III to Section-III

ADDENDUM TO INSTRUCTIONS TO BIDDERS
(INSTRUCTIONS FOR PARTICIPATION IN E-TENDER)

Available on Govt. CPP Portal- https://etenders.gov.in/eprocure/app

https://etenders.gov.in/eprocure/app?page=BiddersManualKit&service=page

ANNEXURE-IV to Section-III

BIDDING DATA SHEET (BDS)

(TO BE FILLED BY THE CONCERNED DEALING OFFICER BEFORE ISSUANCE OF TENDER)

ITB TO BE READ IN CONJUNCTION WITH THE FOLLOWING:

A. GENERAL	
ITB clause	**Description**
1.1	The Employer/Owner is: Indradhanush Gas Grid Limited
2.1	The name of the Works/Services to be performed is: **TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)**
3	BIDS FROM CONSORTIUM/ JOINT VENTURE APPLICABLE: X NOT APPLICABLE: √
B. BIDDING DOCUMENT	
ITB clause	**Description**
8.1	For **clarification purposes** only, the communication address is: Attention: Vaidant Bairwa, Dy. GM I/c (Contracts) Street Address: MECON LIMITED Floor/Room number: 15th Floor, Scope Minor, District Centre , Laxmi Nagar City: Delhi ZIP Code: 110092 Country: India Tel no.: 011-22401224/ 22401143 Email : cont-delhi@meconlimited.co.in
C. PREPARATION OF BIDS	
ITB clause	**Description**
11.1.1 (u)	Additional documents to be submitted by the Bidder with its Part-I (Techno-commercial/ Unpriced bid) : SCC/Scope of Work refers *NIL*
12	Additional Provision for Schedule of Rate/ Bid Price are as under: NIL

<table>
<tr><td>12 & 13</td><td>Whether IGGL will be able to avail input tax credit in the instant tender
<table><tr><td>YES</td><td>X</td></tr><tr><td>NO</td><td>√</td></tr></table>
Details of Buyer:<table><tr><td>Services to be rendered at</td><td>Indradhanush Gas Grid Limited,
Complete Address - Shall be intimated at the time of award.</td></tr><tr><td>PAN No.</td><td>AAECI9589F</td></tr><tr><td>GST no.</td><td>18AAECI9589F1ZZ (Assam)
16AAECI9589F1Z3 (Tripura)
17AAECI9589F1Z1 (Meghalaya)
15AAECI9589F1Z5 (Mizoram)
14AAECI9589F1Z7 (Manipur)
13AAECI9589F1Z9 (Nagaland)
12AAECI9589F1ZB (Arunachal Pradesh)
19AAECI9589F1ZX (West Bengal)
11AAECI9589F1ZD (Sikkim)</td></tr><tr><td>IGGL Bank details</td><td>Account Holder’s Name: INDRADHANUSH GAS GRID LIMITED (IGGL)
Bank Name: State Bank of India
Account No.: CURRENT A/C NO. 37967639273
IFSC Code: SBIN0003030
BRANCH: DISPUR</td></tr></table></td></tr>
<tr><td>14</td><td>The currency of the Bid shall be INR</td></tr>
<tr><td>15</td><td>The bid validity period shall be 03 (Three) Months from final 'Bid Due Date'.</td></tr>
<tr><td>16.1, 16.10 and 38.6</td><td>In case 'Earnest Money / Bid Security' or “Contract Performance Security” is in the form of 'Demand Draft' or 'Banker's Cheque' or ‘Insurance Surety Bond’ / ‘Fixed Deposit Receipt’, the same should be favor of Indradhanush Gas Grid Limited, payable at Guwahati, Assam

In case of submission through online banking transaction i.e. IMPS / NEFT / RTGS / SWIFT, etc, the details of IGGL’s Bank account are as under:
Account Holder’s Name: INDRADHANUSH GAS GRID LIMITED (IGGL)
Account Number: CURRENT A/C NO. 37967639273
IFSC Code: SBIN0003030
BRANCH: DISPUR
Bank Name: State Bank of India
Bidder to mention reference no. “EMD/…….” in narration while remitting the EMD / Bid Security amount and to mention reference no. “CPS/…….” in narration while remitting the CPS amount in IGGL’s Bank Account.</td></tr>
</table>

<table>
<tr><th colspan="2">D. SUBMISSION AND OPENING OF BIDS</th></tr>
<tr><th>ITB clause</th><th>Description</th></tr>
<tr><td>18</td><td>In addition to the original of the Bid, the number of copies required is one. Not applicable in case of e-tendering.</td></tr>
<tr><td>22</td><td>The E-Tender No. of this bidding process is: 2026_IGGL_288973_1</td></tr>
<tr><td>22.3, 26 and 4.0 of IFB</td><td>For <u>bid submission purposes</u> only (Manual) or the submission of physical document as per clause no. 4.0 of IFB, and Bid Opening Purpose the Owner's address is :

Attention: Vaidant Bairwa, Dy. GM I/c (Contracts)
Street Address: MECON LIMITED
Floor/Room number: 15th Floor, Scope Minor, District Centre , Laxmi Nagar
City: Delhi
ZIP Code: 110092
Country: India</td></tr>
<tr><th colspan="2">E. EVALUATION, AND COMPARISON OF BIDS</th></tr>
<tr><th>ITB clause</th><th>Description</th></tr>
<tr><td>32</td><td>Evaluation Methodology is mentioned in Section-II.</td></tr>
<tr><td>33</td><td>Compensation for Extended Stay:
<table><tr><td>APPLICABLE</td><td>√</td></tr><tr><td>NOT APPLICABLE</td><td>X</td></tr></table></td></tr>
<tr><td>34</td><td>The following Purchase Preference Policy will be applicable as per provisions mentioned in tender:

i) Policy to Provide Purchase Preference as per Public Procurement (Preference to Make in India), Order 2017</td></tr>
<tr><th colspan="2">F. AWARD OF CONTRACT</th></tr>
<tr><th>ITB clause</th><th>Description</th></tr>
<tr><td>37</td><td>State of India of which stamp paper is required for Contract Agreement: Assam Guwahati</td></tr>
<tr><td>38</td><td>Contract Performance Security/ Security Deposit
<table><tr><td>APPLICABLE</td><td>√</td></tr><tr><td>NOT APPLICABLE</td><td>X</td></tr></table>
<u>The value/ amount of Contract Performance Security/ Security Deposit:</u> Procurement of Works (including LSTK/ EPC Contracts) except Rate Contracts:</td></tr>
</table>

<table>
<tr><td></td><td>SD / CPBG @ 10% of Total Order / Contract value within 30 days of FOA / notification of award.
OR
Initial security deposit (ISD) @ 5% of Total Contract value within 30 days of FOA / notification of award and deduction @ 10% of the RA bill subsequently from the RA bills till the total amount of security deposit (including ISD and deducted amount) reaches 10% of Total Contract value.

Order value as mentioned above will be exclusive of GST.</td></tr>
<tr><td>39.2</td><td>Name and contact details of nodal officer are as under:
Shri. Shri Raja Ahmed
Email: raja.ahmed@iggl.co.in</td></tr>
<tr><td>Annexure-V to Section-III (PP-LC Policy)</td><td>Whether tendered item is non-split able or not-divisible :
<table><tr><td>YES</td><td>√</td></tr><tr><td>NO</td><td>X</td></tr></table></td></tr>
<tr><td>41</td><td>Provision of AHR Item :
<table><tr><td>APPLICABLE</td><td>√</td></tr><tr><td>NOT APPLICABLE</td><td>X</td></tr></table></td></tr>
<tr><td>44.1</td><td>Quarterly Closure of Contract
<table><tr><td>APPLICABLE</td><td>√</td></tr><tr><td>NOT APPLICABLE</td><td>X</td></tr></table></td></tr>
<tr><td>Clause no. 27.3 of GCC</td><td>Bonus for Early Completion:
<table><tr><td>APPLICABLE</td><td>X</td></tr><tr><td>NOT APPLICABLE</td><td>√</td></tr></table></td></tr>
</table>

<table>
<tr><td>49</td><td>Applicability of provisions relating to Startups:
<table><tr><td>APPLICABLE</td><td>x</td></tr><tr><td>NOT APPLICABLE</td><td>√</td></tr></table></td></tr>
<tr><td>SCC</td><td>Documents required for accepting the Works:

Refer cl.no. 24 of SCC.</td></tr>
</table>

ANNEXURE-V TO SECTION-III

POLICY TO PROVIDE PURCHASE PREFERENCE AS PER PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017

1.0 Ministry of Petroleum & Natural Gas vide Notification No. FP-20013/2/2017-FP-PNG-Part(4) (E-17013) dated 21.08.2024 has notified the Public Procurement (Preference to Make in India), Order 2017 (PPP-MII)-Revision issued by DPIIT on 19.07.2024.

The following modifications as per Notification No. FP-20013/2/2017-FP-PNG-Part(4) (E-41432) dated 26.04.2022 from MoP&NG and incorporated in Para 1.0 above shall continue:

- Limit for exemption of small purchase under para 4 of the PPP-MII Order, 2017 shall be Rs. 1 Crore.
- HP-HT operation in upstream oil and gas turbines activities shall be exempted from applicability of the Order.

Whereas, in respect of Local value addition through services, as per communication no. F.No. FP-20013/2/2017-FP-PNG-Part(4) (E-41432) dated 26.03.2024 of MoP&NG, the same is modified as under:

Local Value addition through services such as transportation, insurance, installation, commissioning, training and after sales services support like AMC/CMC etc. shall continue to be considered in local content calculation and the scope of this relaxation shall be limited to the items (as per list enclosed) to be installed/operated in flammable environment of Oil and Gas processing industry.

2.0 The Public Procurement (Preference to Make in India), Order 2017 (PPP-MII) issued by DPIIT to encourage 'Make in India' and promote manufacturing & production of goods and services in India with a view to enhancing income and employment.

3.0 **DEFINITIONS:-**

(i) **Local Content** means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value, in percent.

Local Value addition through services such as transportation, insurance, installation, commissioning, training and after sales services support like AMC/CMC etc. shall continue to be considered in local content calculation and the scope of this relaxation shall be limited to the items (as per list enclosed) to be installed/operated in flammable environment of Oil and Gas processing industry.

Explanatory notes for calculation of local content given below:

a) Imported items sourced locally from resellers/distributors shall be excluded from calculation of local content.

b) The license fees/royalties paid/ technical charges paid out of India shall be excluded from local content calculation.

c) Procurement/Supply of repackaged/refurbished/rebranded imported products as understood commonly shall be treated as reselling of imported products and shall be excluded from calculation of local content. The definition of repackaged/refurbished/rebranded imported products is as follows :

'Refurbishing' means repair or reconditioning of an imported product does not amount to manufacture because no new goods come into existence.

'Repackaging' means repacking of imported goods from bulk pack to smaller packs would not ordinarily amount to manufacture of a new item.

'Rebranding' means relabeling or renaming or change in symbol or logo/ makes or corporate image of a company/ organization/ firm for an imported product would amount to rebranding.

d) To ensure that imported items sourced locally from resellers/distributors are excluded from calculation of local content, procuring entities to obtain from bidders, the cost of such locally-sourced imported items (Inclusive of taxes) along with break-up on license/royalties paid/technical expertise cost etc. sourced from outside India. For items sold by bidder as reseller, OEM certificate for country of origin to be submitted.

e) For contracts involving supply of multiple items, weighted average of all items to be taken while calculating the local content.

(ii) **'Class-I local supplier'** means a supplier or service provider, whose goods, services or works offered for procurement, meets the minimum local content of equal to or more than 50%.

'Class-II local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, meets the minimum local content of more than 20% but less than 50%.

'Non - Local supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than or equal to 20%.

(iii) **L1** mean the lowest tender or lowest bid or the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per tender or other procurement solicitation.

(iv) **Margin of Purchase Preference:** means the maximum extent to which the price quoted by a Class-I local supplier may be above the L1 for purpose of purchase Preference.

(v) **Nodal Ministry** means the Ministry of Petroleum & Natural Gas

(vi) **Procuring Entity** means Indradhanush Gas Grid Limited (IGGL)

(vi) **Works** means all the works as per Rule 130 of GFR-2017 also include 'turnkey works'

3A Special treatment for items covered under PLI Scheme

The manufacturers manufacturing an item under PLI scheme shall be treated as deemed Class II local supplier for that item unless they have minimum local content equal to or higher than that notified for Class-I local supplier for that item, provided the manufacturer has received incentive from the concerned PLI Ministry for the Item. The above shall be applicable for the specific time period only, as notified by concerned PLI Ministry.

4.0 **Margin of Purchase Preference:** The margin of purchase preference shall be 20%.

5.0 **ELIGIBILITY OF 'CLASS-I LOCAL SUPPLIER'/ 'CLASS-II LOCAL SUPPLIER'/ 'NON-LOCAL SUPPLIERS' FOR DIFFERENT TYPES OF PROCUREMENT**

(a) In procurement of all goods, services or works in respect of which the Nodal Ministry / Department has communicated that there is sufficient local capacity and local competition, only 'Class-I local supplier', shall be eligible to bid irrespective of purchase value.

(b) Only 'Class-I local supplier' and 'Class-II local supplier', shall be eligible to bid in procurements undertaken by procuring entities, except when Global tender enquiry/ International Competitive bidding has been issued. In global tender enquiries/ International Competitive bidding 'Non local suppliers' shall also be eligible to bid along with 'Class-I local suppliers' and 'Class-II local suppliers'.

(c) Works includes Engineering, Procurement and Construction (EPC) contracts and services include System Integrator (SI) contracts

(d) HP-HT Operations in upstream oil and gas business activities shall be exempted from this order.

6.0 MANDATORY SOURCING OF ITEMS, WITH SUFFICIENT LOCAL CAPACITY AND COMPETITION, FROM CLASS-I LOCAL SUPPLIERS IN SI/EPC/TURNKEY CONTRACTS/SERVICE TENDERS

(a) The items, notified as having sufficient local capacity and competition, shall mandatory be sourced from Class-I local suppliers in SI/EPC/Turnkey Contracts/ Services tenders. This provision will be applicable only for those items which have been notified by the Nodal Ministry as Class I i.e. having sufficient local capacity and competition, with specific HSN codes."

(b) Notwithstanding above, if in any project, it is considered that it is not practically feasible to source such items from Class I local suppliers, it may take relaxation from such stipulation with the approval of Secretary of the administrative Ministry/ Department concerned or with the approval of the Competent Authority specified by the Administrative Ministry/Department, on case-specific basis.

7.0 PURCHASE PREFERENCE METHODOLOGY UNDER PPP-MII

(a) Purchase preference shall be given to 'Class-I local supplier' in procurements in the manner specified here under.

(b) In the procurements of goods or works which are cover by para 5 (b) above and which are divisible in nature, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract for full quantity will be awarded to L1.

ii. If L1 bid is not a 'Class-I local supplier', 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the 'Class-I local supplier' will be invited to match the L1 price for the remaining 50% quantity subject to the Class-I local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such 'Class-I local supplier' subject to matching the L1 price. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price or accepts less than the offered quantity, the next higher 'Class-I local supplier' within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on Class-I local suppliers, then such balance quantity may also be ordered on the L1 bidder.

(c) In the procurements of goods or works which are covered by para 5 (b) and which are not divisible in nature, and in procurement of services where the bid is evaluated on price alone, the 'Class-I local supplier' shall get purchase preference over 'Class-II local supplier' as well as 'Non-local supplier', as per following procedure:

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is 'Class-I local supplier', the contract will be awarded to L1.

ii. If L1 is not 'Class-I local supplier', the lowest bidder among the 'Class-I local supplier', will be invited to match the L1 price subject to Class-I local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such 'Class-I local supplier' subject to matching the L1 price.

iii. In case such lowest eligible 'Class-I local supplier' fails to match the L1 price, the 'Class-I local supplier' with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the 'Class-I local supplier' within the margin of purchase preference matches the L1 price, the contract may be awarded to the L1 bidder.

iii. "Class-II local supplier" will not get purchase preference in any procurement.

d) **Applicability in tenders where contract is to be awarded to multiple bidders** - In tenders where contract is awarded to multiple bidders subject to matching of L1 rates or otherwise, the 'Class-I local supplier' shall get purchase preference over 'Class II- local supplier' as well as 'Non-local supplier', as per following procedure:

i) If 'Class-I Local suppliers' qualify for award of contract for at least 50% of the tendered quantity in any tender, the contract may be awarded to all the qualified bidders as per award criteria stipulated in the bid documents. However, in case 'Class -I Local suppliers' do not qualify for award of contract for at least 50% of the tendered quantity, purchase preference should be given to the 'Class-I local supplier' over 'Class-II local suppliers'/ 'Non local suppliers' provided that their quoted rate falls within 20% margin of purchase preference of the highest quoted bidder considered for award of contract so as to ensure that the 'Class-I Local suppliers' taken in totality are considered for award of contract for at least 50% of the tendered quantity.

ii) First purchase preference has to be given to the lowest quoting 'Class-I local supplier', whose quoted rates fall within 20% margin of purchase preference, subject to its meeting the prescribed criteria for award of contract as also the constraint of maximum quantity that can be sourced from any single supplier. If the lowest quoting 'Class-I local supplier', does not qualify for purchase preference because of aforesaid constraints or does not accept the offered quantity, an opportunity may be given to next higher 'Class-I local supplier', falling within 20% margin of purchase preference, and so on.

8.0 EXEMPTION IN SOURCING OF SPARES AND CONSUMABLES OF CLOSED SYSTEMS FOR PURCHASE PREFERENCE

Procurement of spare parts/consumables and Maintenance/ Service contracts with Original Equipment Manufacturer/Original Equipment Supplier/Original Part Manufacturer shall be exempted from this Order.

9.0 VERIFICATION OF LOCAL CONTENT/ DOMESTIC VALUE ADDITION

a. The 'Class-I local supplier'/ 'Class-II local supplier' at the time of tender, bidding or solicitation shall require to indicate percentage of local content and provide pas per proforma at Form-1) that the item offered meets the minimum local content for 'Class-I local supplier'/ 'Class-II local supplier' as the case may be and shall give details of the location(s) at which the local value addition is made.

b. In cases of procurement for a value in excess of Rs. 10 crores, in addition to Form-1 'Class-I local supplier'/ 'Class-II local supplier' shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content as per proforma at Form -2.

The bidder shall give self-certification for local content in the quoted item (goods/works/services) at the time of tendering. However, at the time of execution of the project, for all contracts above INR 10 Crore, the contractor/ supplier shall be required to give local content certification duly certified by cost/ chartered accountant in practice For cases where it is not possible to provide certification by Cost/Chartered Accountant at the time of execution of project, the supplier shall be permitted to provide the certificate for local content from Cost/ Chartered Accountant after completion of the contract, within time limit acceptable to the procuring entity. In case the contractor/ supplier does not meet the stipulated local content requirement and the category of the supplier changes from Class-I to Class-II/ Non-local or from Class-II to Non-local, a penalty upto 10% of the contract value may be imposed. However, contract once awarded shall not be terminated on this account.

c. In case a complaint is received by the procuring agency relating to implementation of this order including the claim of a bidder regarding local content/ domestic value addition, the same shall be referred to Competent Authority who is empowered to look into procurement related complaints.

d. Nodal Ministry may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/accountant's certificates on random basis and in the case of complaints. A complaint fee of Rs.2 Lakh or 1% of the value of the domestically manufactured products being procured (subject to a maximum of Rs. 5 Lakh), whichever is higher, shall be paid by Demand Draft to be deposited with IGGL. In case, the complaint is found to be incorrect, the complaint fee shall be forfeited. In case, the complaint is upheld and found to be substantially correct, deposited fee of the complainant would be refunded without any interest.

e. In case of false declarations, IGGL shall initiate action for banning such manufacturer/supplier/service provider as per as per IGGL's extant "Procedure for action in case Corrupt/Fraudulent/Collusive/Coercive Practices"

f. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph g below.

g. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:

   i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry /Department or in some other manner;

   ii. on a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is

maintained and displayed on website(s);

iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

9.0 RECIPROCITY CLAUSE

i. When a Nodal Ministry/Department identifies that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, due to restrictive tender conditions which have direct or indirect effect of barring Indian companies such as registration in the procuring country, execution of projects of specific value in the procuring country etc., it shall provide such details to all its procuring entities including CMDs/CEOs of PSEs/PSUs, State Governments and other procurement agencies under their administrative control and GeM for appropriate reciprocal action.

ii. Entities of countries which have been identified by the nodal Ministry/Department as not allowing Indian companies to participate in their Government procurement for any item related to that nodal Ministry shall not be allowed to participate in Government procurement in India for all items related to that nodal Ministry/ Department, except for the list of items published by the Ministry/ Department permitting their participation.

iii. The term 'entity' of a country shall have the same meaning as under the FDI Policy of DPIIT as amended from time to time.

FORM-1

UNDERTAKING FOR APPLICABILITY OF POLICY (APPLICABLE FOR MSEs and CLASS-I LOCAL SUPPLIER ONLY)

VOID

FORM-2

SELF CERTIFICATION BY BIDDER WHO CLASS-I LOCAL SUPPLIER/ CLASS-II LOCAL SUPPLIER TOWARDS MANDATORY MINIMUM LOCAL CONTENT/ DOMESTIC VALUE ADDITION
(APPLICABLE FOR ALL BIDDERS INCLUDING MSEs)

To,

M/s Indradhanush Gas Grid Limited
7th Floor , NRL Centre , G S Road, Christian Basti , Guwahati , Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Dear Sir

We, M/s_____ ***(Name of Bidder)*** confirm that as per the definition of policy we are:

Class-I Local supplier [ ]

Class-II Local Supplier [ ]

(Bidder is to tick appropriate option (✓) above).

It is further confirm that M/s_____ ***(Name of Bidder)*** meet the mandatory minimum Local content/Domestic Value Addition requirement for Class-I Local supplier/ Class-II Local supplier (as the case may be) under Public Procurement (Preference to Make in India), Order 2017 (PPP-MII) and has value addition of ……%.

The details of the location (s) at which the local value addition is made is as under:
……
……...
……

We further confirm that in case we fail to meet the minimum local content/domestic value addition, the same shall be treated false information and IGGL will take action as per provision of tender document.

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

FORM-3

CERTIFICATE BY STATUTORY AUDITOR/COST AUDITOR/ CHARTERED ACCOUNTANT OF BIDDER TOWARDS MANDATORY MINIMUM LOCAL CONTENT/ DOMESTIC VALUE ADDITION
(APPLICABLE FOR ALL BIDDERS INCLUDING MSEs)

To,

M/s Indradhanush Gas Grid Limited
7th Floor , NRL Centre , G S Road, Christian Basti , Guwahati , Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Dear Sir

"We _____ the statutory auditor/ cost auditor/chartered accountant (not an employee of the company) of M/s._____ (***Name of the bidder***) hereby certify that as per definition specified in policy, M/s._____ (***Name of the bidder***) is

Class-I Local supplier [ ]

Class-II Local Supplier [ ]

(Bidder is to tick appropriate option (✓) above).

It is further confirm that M/s_____ ***(Name of Bidder)*** quoted vide offer No. _____ dated _____ against tender No._____ meet the mandatory minimum Local content/Domestic Value Addition requirement specified for Class-I Local supplier/ Class-II Local supplier (as the case may be) under Policy for Public Procurement (Preference to Make in India), Order 2017 (PPP-MII) and has value addition of ……% .

Name of Audit Firm:

Date:

[Signature of Authorized Signatory]
Name:
Designation:
Seal:
Membership no.

Note:

(i) This certificate it to be furnished by the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies)

(ii) The above format is indicative, the statutory auditor/ cost auditor/ cost accountant can modify the format without changing the intent of certification.

ANNEXURE-VI TO SECTION-III

PROVISION REGARDING POLICY TO PROVIDE PREFERENCE TO DOMESTICALLY MANUFACTURED IRON & STEEL PRODUCTS (DMI&SP)

रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

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असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)
PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित
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इस्पात मंत्रालय

अधिसूचना

नई दिल्ली, 26 मई, 2025

सा.का.नि. 341(अ).— घरेलू स्तर पर विनिर्मित पूर्ववर्ती लौह एवं इस्पात उत्पाद नीति के अधिक्रमण में, सरकारी अधिप्राप्ति में घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पादों को वरीयता प्रदान करने के लिए संशोधित घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पाद नीति-2025 को आम सूचना के लिए एतदद्वारा प्रकाशित किया जाता है।

सरकारी अधिप्राप्ति में घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पादों को वरीयता देने के लिए नीति - संशोधित, 2025

1. पृष्ठभूमि

1.1 यह नीति सरकारी अधिप्राप्ति में घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पादों (डीएमआईएंडएसपी) को वरीयता देती है।

1.2 यह नीति परिशिष्ट क में अधिसूचित लौह एवं इस्पात उत्पादों की खरीद पर लागू होती है। परिशिष्ट ख में, लौह एवं इस्पात उत्पादों के विनिर्माण के लिए न्यूनतम घरेलू सामग्री और पूंजीगत वस्तुओं

की छूट प्राप्त सूची सूचीबद्ध की गई है, जिन्हें आयात किया जा सकता है। परिशिष्ट ग में स्वदेशी प्रौद्योगिकी आपूर्तिकर्ताओं से प्रौद्योगिकी की खरीद को बढ़ावा देने की नीति शामिल है।

2. परिभाषाएं

2.1 **बोलीदाता** लौह एवं इस्पात का कोई घरेलू/विदेशी विनिर्माता अथवा उनके बिक्री एजेंट/अधिकृत वितरक/अधिकृत डीलर/अधिकृत आपूर्ति गृह अथवा सरकारी एजेंसियों द्वारा वित्त पोषित परियोजनाओं में बोली लगाने में कार्यरत कोई अन्य कंपनी हो सकती है।

2.2 **घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पाद (डीएमआईएंडएसपी)** वे लौह एवं इस्पात उत्पाद हैं जिनका विनिर्माण उन प्रतिष्ठानों द्वारा किया जाता है जो भारत में पंजीकृत और स्थापित हैं, जिसमें विशेष आर्थिक क्षेत्र (एसईजैड) शामिल हैं।

2.3 **घरेलू विनिर्माता** खंड 7 में दिशा निर्देशों और केंद्रीय उत्पाद शुल्क अधिनियम के अनुसार 'विनिर्माता' की परिभाषा के अनुरूप लौह एवं इस्पात उत्पादों का एक विनिर्माता है।

2.4 **घरेलू मूल्य संवर्धन** का अर्थ है - भारत में जोड़े गए मूल्य की राशि जो अधिप्राप्त की जाने वाली वस्तु के कुल मूल्य (शुद्ध घरेलू अप्रत्यक्ष करों को छोड़कर) में से अधिप्राप्त की जाने वाली वस्तु के कुल मूल्य के अनुपात के रूप में वस्तु में आयातित सामग्री के मूल्य (सभी सीमा शुल्कों सहित) को घटाकर प्रतिशत में प्राप्त होगी। 'घरेलू मूल्य संवर्धन' की परिभाषा डीपीआईआईटी दिशा-निर्देशों के अनुरूप होगी और भविष्य में डीपीआईआईटी द्वारा किसी भी बदलाव के मामले में इसे उपयुक्त रूप से संशोधित किया जाएगा। इस नीति दस्तावेज के उद्देश्य के लिए, घरेलू मूल्य संवर्धन और स्थानीय सामग्री का परस्पर उपयोग किया गया है।

% घरेलू मूल्य संवर्धन =

{अधिप्राप्त की जाने वाली वस्तु का कुल मूल्य (शुद्ध घरेलू अप्रत्यक्ष करों को छोड़कर) - वस्तु में आयातित सामग्री का मूल्य (सभी सीमा शुल्कों सहित)}

---------- X 100%

{अधिप्राप्त की जाने वाली वस्तु का कुल मूल्य}

2.5 **तैयार इस्पात** (फिनिश्ड स्टील) का तात्पर्य सपाट और लंबे उत्पादों से होगा, जिन्हें बाद में प्रसाधित कर विनिर्मित वस्तु बनाया जा सकता है।

2.6 इस नीति के प्रयोजन से **सरकार** का तात्पर्य भारत सरकार से है।

2.7 **सरकारी एजेंसियों** में सरकार के सार्वजनिक क्षेत्र के उपक्रम, भारत सरकार द्वारा स्थापित सोसायटी, ट्रस्ट और सांविधिक निकाय शामिल हैं।

2.8 **स्वदेशी प्रौद्योगिकी:** किसी प्रौद्योगिकी को स्वदेशी प्रौद्योगिकी माना जाएगा यदि, इकाई की कम से कम 51% इक्विटी भारतीय निवासियों के पास हो और आईपीआर का स्वामित्व या सह-स्वामित्व

किसी भारतीय इकाई के पास हो या विशेष रूप से उन्हें लाइसेंस प्राप्त हो तथा मुख्य इंजीनियरिंग अनुसंधान एवं विकास और परियोजना निष्पादन क्षमताएं भारत में हों।

2.9 **एल1** का तात्पर्य निविदा अथवा अन्य अधिप्राप्ति अनुरोध के अनुसार मूल्यांकन प्रक्रिया में यथाघोषित निविदा, बोली लगाने संबंधी प्रक्रिया अथवा अन्य अधिप्राप्ति अनुरोधों में प्राप्त न्यूनतम निविदा अथवा न्यूनतम बोली अथवा न्यूनतम भाव से होगा।

2.10 **एमओएस** का आशय इस्पात मंत्रालय, भारत सरकार से है।

2.11 **खरीद वरीयता के मार्जिन** का तात्पर्य उस अधिकतम सीमा से है जिस सीमा तक किसी घरेलू आपूर्तिकर्ता द्वारा लगाई गई कीमत खरीद वरीयता के प्रयोजन से एल1 से अधिक हो। डीएमआईएंडएसपी नीति के मामले में, खरीद वरीयता का मार्जिन परिशिष्ट ख में मदों के लिए 20% होगा।

2.12 **मेल्ट एंड पोर** को एक ऐसे इस्पात के रूप में परिभाषित किया गया है जिसे इस्पात बनाने वाले फर्नेस में उत्पादित किया जाता है और इसे अपने पहले ठोस आकार में डाला जाता है। जिस स्थान पर यह प्रक्रिया होती है उसे मेल्ट एंड पोर का उद्गम स्थल (सीओएम) कहा जाता है। सीओएम वह मूल स्थान है जहाँ क्रूड इस्पात को पहली बार तरल अवस्था में उत्पादित किया जाता है और इसे अपने पहले ठोस आकार में डाला जाता है। पहला ठोस आकार एक अर्ध-तैयार उत्पाद जैसे स्लैब, बिलेट, पिंड या एक तैयार इस्पात मिल उत्पाद हो सकता है।

2.13 **निवल बिक्री मूल्य** इन्वॉइस मूल्य होगा जिसमें निवल घरेलू कर और शुल्क शामिल नहीं होंगे।

2.14 **अर्ध-तैयार इस्पात** (सेमी-फिनिश्ड स्टील) का तात्पर्य इनगोट्स, बिलेट्स, ब्लूम्स और स्लेब्स से है, जिसे बाद में प्रसाधित कर तैयार इस्पात बनाया जा सकता है। पल

3. अपवर्जन

3.1 इस्पात मंत्रालय द्वारा इस प्रकार की सभी सरकारी अधिप्राप्ति के लिये निम्नलिखित शर्तों के अध्यधीन छूट प्रदान की जा सकती है।

3.1.1 जहां विशिष्ट ग्रेडों के इस्पात का निर्माण इस देश में नहीं किया जाता हो, अथवा

3.1.2 जहां परियोजना की मांग के अनुसार इन मात्राओं को घरेलू स्रोतों के माध्यम से पूरा नहीं किया जा सकता हो।

3.2 छूट संबंधी अनुरोध लौह एवं इस्पात उत्पादों की घरेलू स्तर पर अनुपलब्धता के पर्याप्त प्रमाण के साथ स्थायी समिति के समक्ष प्रस्तुत किए जाएंगे।

4. स्थायी समिति

4.1 सचिव (इस्पात) की अध्यक्षता में एक स्थायी समिति नीति के कार्यान्वयन को देखेगी।

4.2. इस समिति में उद्योग/उद्योग संघ/सरकारी संस्था अथवा निकाय/इस्पात मंत्रालय (एमओएस) से लिए गए विशेषज्ञ शामिल होंगे। इस्पात मंत्रालय में उक्त समिति के पास निम्नलिखित के लिए अधिदेश होगा:

4.2.1 नीति के कार्यान्वयन की निगरानी करना।

4.2.2 परिशिष्ट क, परिशिष्ट ख और परिशिष्ट ग में उल्लिखित लौह एवं इस्पात उत्पादों की सूची, घरेलू सामग्री आवश्यकता मानदंड और नीति निर्देशों की समीक्षा करना और उन्हें अधिसूचित करना।

4.2.3 पैरा 3 के अनुसार प्रापण एजेंसियों को अपवर्जन की स्वीकृति देने सहित इस नीति के कार्यान्वयन के लिए आवश्यक स्पष्टीकरण जारी करना।

4.2.4 इस नीति के कार्यान्वयन से संबंधित शिकायतों की प्रारंभिक जांच के लिए एक शिकायत निवारण समिति का गठन करना।

4.2.5 अधिप्राप्ति एजेंसी द्वारा इस नीति का अनुपालन न किए जाने की स्थिति में संबंधित मंत्रालयों/विभागों को उचित कार्रवाई के लिए निर्देश जारी करना और सलाह देना।

4.3 जहां भी प्रापण इकाई इस निष्कर्ष पर पहुंचती है कि उपलब्ध बोलीदाता/विनिर्माता द्वारा अनुचित रूप से उच्च मूल्य निर्धारित किया गया है, तो मामले को स्थायी समिति को भेजा जा सकता है। ऐसे मामलों में, प्रापण इकाई को अपने मामले को पूर्ण और विस्तृत दस्तावेज़ों के साथ प्रमाणित करना होगा।

4.4 बोली दस्तावेज़ में विदेशी प्रमाणन/अनुचित तकनीकी विनिर्देश निर्दिष्ट करना स्थानीय आपूर्तिकर्ताओं के विरुद्ध प्रतिबंधात्मक और भेदभावपूर्ण व्यवहार है। यदि भारतीय मानकों की अनुपलब्धता और/या किसी अन्य कारण से विदेशी प्रमाणन निर्धारित करना आवश्यक है, तो ऐसा समिति की लिखित स्वीकृति के बाद ही किया जाएगा।

5. प्रयोज्यता

5.1 यह नीति सरकार के प्रत्येक मंत्रालय अथवा विभाग और उनके प्रशासनिक नियंत्रणाधीन सभी एजेंसियों/इकाइयों तथा सरकारी परियोजनाओं के लिए लौह एवं इस्पात उत्पादों की खरीद हेतु इन एजेंसियों द्वारा वित्त पोषित परियोजनाओं पर लागू है। केन्द्रीय क्षेत्र की सभी योजनाएं (सीएस)/ केन्द्रीय प्रायोजित योजनाएं (सीएसएस) जिनके लिए राज्यों और स्थानीय निकायों द्वारा खरीद की जाती है, इस नीति की परिधि में आएंगी, यदि उस परियोजना/योजना को भारत सरकार द्वारा पूर्णतया/अंशत: वित्तपोषित किया जाता है।

5.2 यह नीति सार्वजनिक क्षेत्रों के इस्पात विनिर्माताओं और उनके प्रशासनिक नियंत्रणाधीन एजेंसियों/इकाइयों पर लौह एवं इस्पात उत्पादों के विनिर्माण के लिए पूंजीगत मालों (परिशिष्ट-ख) की अधिप्राप्ति के लिए लागू है।

5.3 परिशिष्ट-ख में लौह एंव इस्पात उत्पादों के निर्माण में उपयोग किए जाने वाले पूंजीगत माल की छूट संबंधी सूची दर्शाई गई है, जिन्हें आयात किया जा सकता है, तथा संबंधित पैकेजों के लिए न्यूनतम घरेलू मूल्य संवर्धन आवश्यकता बताई गई है। पूंजीगत माल के लिए घरेलू मूल्य संवर्धन, जैसा कि

दर्शाया गया है, परिवर्तन के अधीन है; उदाहरण के लिए, यदि देश में कुछ पूंजीगत माल घटकों का विनिर्माण किया जाता है, तो घरेलू मूल्य संवर्धन प्रतिशत बढ़ सकता है।

5.4 इस्पात विनिर्माण में उपयोग किए जाने वाले पूंजीगत माल के लिए 20% की खरीद वरीयता लागू है। उदाहरण के लिए, यदि आयात योग्य पूंजीगत माल के लिए न्यूनतम बोलीदाता (एल1) कोई विदेशी कंपनी है, जिसने उत्पाद पैकेज के लिए 100 करोड़ रुपये की कीमत बताई है, तो नीति के तहत, समान पूंजीगत माल के घरेलू आपूर्तिकर्ता के लिए 20% की खरीद वरीयता लागू होगी।

5.5 परिशिष्ट-ग में इस्पात बनाने वाले सीपीएसई के लिए स्वदेशी प्रौद्योगिकी आपूर्तिकर्ताओं से खरीद करने के निर्देश और कार्यप्रणाली दी गई है।

5.6 यह नीति उन परियोजनाओं और गैर-परियोजनाओं पर लागू होगी, जहाँ किसी संविदा में लौह एवं इस्पात उत्पादों (परिशिष्ट-क) का कुल अधिप्राप्ति मूल्य मदवार आधार पर 5 लाख रुपये से अधिक है।

5.7 लौह एवं इस्पात उत्पादों की अधिप्राप्ति से संबंधित निविदाओं के लिए कोई वैश्विक निविदा इन्क्वायरी (जीटीई) आमंत्रित नहीं की जाएगी (डीएमआईएंडएसपी नीति का परिशिष्ट-क)। लौह एवं इस्पात उत्पादों के विनिर्माण जिनका अनुमानित मूल्य 200 करोड़ रु. तक हो, (डीएमआईएंडएसपी नीति के परिशिष्ट-ख) के लिए पूंजीगत माल की अधिप्राप्ति से संबंधित निविदाओं के लिए कोई वैश्विक निविदा इन्क्वायरी (जीटीई) व्यय विभाग द्वारा यथा नाम-निर्दिष्ट सक्षम प्राधिकारी के अनुमोदन के अलावा आमंत्रित नहीं की जाएगी।

5.8 यह नीति सरकार के मंत्रालय अथवा विभाग अथवा उनके सार्वजनिक क्षेत्र के उपक्रमों की किसी ईपीसी संविदा और/ अथवा अन्य आवश्यकता को पूरा करने के लिए को पूरा करने के लिए निजी एजेंसियों द्वारा लौह एवं इस्पातों की अधिप्राप्ति पर लागू है।

6. अधिप्राप्ति के लिए निविदा प्रक्रिया

6.1 प्रापण एजेंसियां डीएमआईएंडएसपी नीति का पालन करते समय वित्त मंत्रालय और सीवीसी के अनुदेशों के अनुसार मानक अधिप्राप्ति संबंधी प्रक्रियाओं का पालन करेगी।

6.2 माल की अधिप्राप्ति के साथ-साथ ईपीसी संविदाओं के लिए निविदा दस्तावेज में परिशिष्ट क और परिशिष्ट ख में उल्लिखित आवश्यकताओं के अनुपालन के लिए योग्यता मानदंड को स्पष्ट रूप से रेखांकित किया जाना चाहिए।

6.3 परिशिष्ट-क और परिशिष्ट-ख के तहत आने वाले उत्पादों के घरेलू विनिर्माताओं को बोली लगाते समय नीति में निर्धारित फॉर्म-1 के अनुसार स्थानीय सामग्री का स्व-प्रमाणन करना होगा।

6.4 वे बोलीदाता जो परिशिष्ट-क के अंतर्गत आने वाले लौह एवं इस्पात उत्पादों के घरेलू विनिर्माताओं के विक्रय एजेंट/अधिकृत वितरक/अधिकृत डीलर/अधिकृत आपूर्ति घर हैं, वे नीति के अंतर्गत घरेलू विनिर्माताओं की ओर से स्व-प्रमाणन के साथ बोली लगाने के लिए पात्र हैं, बशर्ते कि बोलीदाता डिलीवरी के समय घरेलू विनिर्माता द्वारा जारी किया गया प्राधिकरण प्रमाणपत्र प्रस्तुत करें।

6.5 डीएमआईएंडएसपी नीति के परिशिष्ट ख के अंतर्गत आने वाले उत्पादों के लिए बोलीदाता को कंपनी के सांविधिक लेखापरीक्षक या लागत लेखापरीक्षक (कंपनियों के मामले में) या किसी व्यवसायिक लागत लेखाकार या व्यवसायिक चार्टर्ड अकाउंटेंट (कंपनियों के अलावा आपूर्तिकर्ताओं के संबंध में) द्वारा जारी प्रमाणीकरण प्रस्तुत करना होगा, जिसमें यह घोषित किया जाएगा कि लौह एवं इस्पात उद्योग में उपयोग किए जाने वाले पूंजीगत माल निर्धारित घरेलू मूल्य संवर्धन के अनुसार घरेलू स्तर पर विनिर्मित किए गए हैं।

6.6 यदि किसी वस्तु के भारतीय आपूर्तिकर्ताओं को किसी विदेशी सरकार द्वारा अधिप्राप्ति में भाग लेने और/या प्रतिस्पर्धा करने की अनुमति नहीं है, क्योंकि निविदा की कुछ प्रतिबंधात्मक शर्तें हैं, जिनका प्रत्यक्ष या अप्रत्यक्ष रूप से भारतीय कंपनियों पर प्रतिबंध है, जैसे अधिप्राप्ति करने वाले देश में पंजीकरण, अधिप्राप्ति करने वाले देश में विशिष्ट मूल्य की परियोजनाओं का निष्पादन आदि, तो वे उचित पारस्परिक प्रापण संस्थाओं को ऐसे विवरण उपलब्ध कराएंगे।

6.7 इस्पात मंत्रालय द्वारा उन देशों की संस्थाओं की पहचान की गई है जो भारतीय कंपनियों को इस्पात मंत्रालय से संबंधित किसी भी वस्तु के लिए अपनी सरकारी अधिप्राप्ति में भाग लेने की अनुमति नहीं देते हैं, उन्हें इस्पात मंत्रालय से संबंधित सभी वस्तुओं के लिए भारत में सरकारी अधिप्राप्ति में भाग लेने की अनुमति नहीं दी जाएगी, सिवाय इस्पात मंत्रालय द्वारा प्रकाशित उन वस्तुओं की सूची के जो उन्हें भाग लेने की अनुमति देती हैं।

6.8 उपरोक्त अनुबंध जैम पोर्टल सहित केन्द्र सरकार की प्रापण संस्थाओं द्वारा आमंत्रित सभी निविदाओं का हिस्सा होगी।

6.9 यदि बोली दस्तावेजों में घरेलू आपूर्तिकर्ताओं के खिलाफ प्रतिबंधात्मक या भेदभावपूर्ण शर्तें शामिल की जाती हैं, तो अधिप्राप्ति करने वाले प्रशासनिक विभाग (इसके प्रशासनिक नियंत्रण के तहत किसी भी इकाई द्वारा अधिप्राप्ति सहित) द्वारा इसकी जिम्मेदारी तय करने के लिए जांच की जाएगी। इसके बाद, संबंधित प्रावधानों के तहत प्रापण संस्थाओं के दोषी अधिकारियों के खिलाफ प्रशासनिक या अन्यथा उचित कार्रवाई की जाएगी। ऐसी सभी कार्रवाई की सूचना डीएमआईएंडएसपी नीति के तहत स्थायी समिति को भेजी जाएगी।

6.10 इस आदेश के उल्लंघन के लिए किसी प्रापण इकाई द्वारा प्रतिबंधित आपूर्तिकर्ता प्रतिबंध की अवधि के दौरान किसी अन्य अधिप्राप्ति करने वाली इकाई द्वारा अधिप्राप्ति के लिए इस आदेश के तहत वरीयता के लिए पात्र नहीं होगा। ऐसी अन्य प्रापण संस्थाओं के लिए प्रतिबंध उस तारीख से प्रभावी होगा जिस दिन यह अन्य अधिप्राप्ति करने वाली संस्थाओं के ध्यान में आता है।

6.11 यदि, इस मामले को इस्पात मंत्रालय के पास भेजा जाता है, तब इस्पात मंत्रालय के अधीन गठित शिकायत निवारण समिति सरकारी एजेंसी के दृष्टिकोण पर विचार करने के बाद बोलीदाता से सभी दस्तावेजों के प्राप्त होने और उसका संदर्भ भेजे जाने के 4 सप्ताह के भीतर शिकायत का निपटारा

करेगी। बोलीदाता से यह अपेक्षित होगा कि वे इस मामले के संदर्भ के 2 सप्ताह के भीतर इस्पात मंत्रालय के अंतर्गत शिकायत निवारण समिति को लौह एवं इस्पात उत्पादों में दावा किए गए घरेलू मूल्यवर्धन के समर्थन में आवश्यक दस्तावेज प्रस्तुत करे।

6.12 निविदा दस्तावेज में निर्धारित घरेलू मूल्यवर्धन का बोलीदाता के द्वारा गलत घोषणा किए जाने की स्थिति में प्रापण ऐजेंसी शास्ती को स्पष्ट रूप से परिभाषित करेगी। इस शास्ती में ऐसे विनिर्माता/ सेवा प्रदाता आदि की ईएमडी को जब्त करना, अन्य वित्तीय शास्ती लगाना और उसे ब्लेकलिस्ट किया जाना शामिल हो सकता है।

7. इस्पात मंत्रालय द्वारा कार्यान्वयन की निगरानी

7.1 इस नीति के प्रावधान प्रकाशन की तिथि से 5 वर्षों की अवधि के लिए लागू रहेंगे और इस नीति की अवधि को इस्पात मंत्रालय के विवेक से और आगे बढ़ाया जा सकता है।

7.2 इस्पात मंत्रालय इस नीति के कार्यान्वयन की निगरानी करने के लिए नोडल मंत्रालय होगा।

7.3 डीएमआईएंडएसपी नीति के अंतर्गत सभी एजेंसियां तिमाही आधार पर घोषणा पत्र भेजेगी जिसमें पिछले वित्तीय वर्ष के दौरान इस नीति के अनुपालन की सीमा और उसके अनुपालन न किए जाने के कारणों को दर्शाया जायेगा।

अनुलग्नक-क

लौह एवं इस्पात उत्पादों की सूची जिनकी अधिप्राप्ति केवल घरेलू स्रोतों से की जा सकती है

क्र.सं.	लौह एवं इस्पात उत्पाद	एचएस कोड	स्थिति
1	600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात के फ्लैट रोल्ड उत्पाद, हॉट रोल्ड, नॉट क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ	7208	मेल्ट एंड पोर
2	600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात के फ्लैट रोल उत्पाद, कोल्ड रोल्ड (रिड्यूज्ड किया हुआ), नॉट क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ	7209	मेल्ट एंड पोर
3	600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात का फ्लैट रोल उत्पाद, क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ	7210	मेल्ट एंड पोर
4	600 मि.मी. से कम की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात का फ्लैट रोल उत्पाद, नॉट क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ	7211	मेल्ट एंड पोर

5	600 मि.मी. कम की चौड़ाई का लौह अथवा गैर-मिश्रधातु इस्पात का फ्लैट रोल उत्पाद, क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ	7212	मेल्ट एंड पोर
6	लौह एवं गैर-मिश्रधातु इस्पात का अनियमित रूप से वूंड क्वाइल में बार्स और रॉड, हॉट रोल्ड	7213	मेल्ट एंड पोर
7	लौह अथवा गैर-मिश्रधातु इस्पात के अन्य बार्स और रॉड्स जिसे फोर्ज किए जाने की तुलना में आगे अधिक वर्क नहीं किया हुआ, हॉट रोल्ड, हॉट ड्रॉन अथवा हॉट एक्सटूडेड परंतु रोलिंग के बाद उसे टिविस्ट किये जाने सहित	7214	मेल्ट एंड पोर
8	लौह अथवा गैर-मिश्रधातु इस्पात का अन्य बार्स एंड रॉड्स	7215	मेल्ट एंड पोर
9	लौह अथवा गैर-मिश्रधातु इस्पात का एंगल, शेप और सेक्शन्स	7216	मेल्ट एंड पोर
10	लौह अथवा गैर-मिश्रधातु इस्पात का वायर	7217	मेल्ट एंड पोर
11	600 मि.मी. अथवा उससे अधिक की चौड़ाई का स्टेनलैस इस्पात का फ्लेट रोल्ड इस्पात	7219	मेल्ट एंड पोर
12	600 मि.मी. से कम की चौड़ाई का स्टेनलैस इस्पात का फ्लैट रोल्ड इस्पात	7220	मेल्ट एंड पोर
13	स्टेनलैस स्टील के अन्य बार्स और रॉड्स; स्टेनलैस स्टील का एंगल शेप और सेक्शन्स	7222	मेल्ट एंड पोर
14	अन्य मिश्रधातु इस्पात के वायर	7229	मेल्ट एंड पोर
15	लौह अथवा इस्पात को रेल, रेलवे अथवा ट्रामवे ट्रेक निर्माण सामग्री	7302	मेल्ट एंड पोर
16	कास्ट लौह के ट्यूब, पाइप और हॉलो पाइप	7303	मेल्ट एंड पोर
17	लौह (कास्ट आयरन को छोड़कर) अथवा इस्पात के ट्यूब पाइप और हॉलो प्रोफाइल, सीमलैस	7304	मेल्ट एंड पोर
18	लौह अथवा इस्पात के सर्कुलर क्रॉस सेक्शन वाले अन्य ट्यूब और पाइप (उदाहरण के लिए, वेल्ड किया हुआ, रिवेट किया हुआ अथवा समान रूप से बंद किया हुआ), जिसकी बाहरी त्रिज्या 406.4 मि.मी. से अधिक हो	7305	मेल्ट एंड पोर
19	लौह अथवा इस्पात के अन्य ट्यूब, पाइप और हॉलो प्रोफाइल (उदाहरण के लिए ओपन सीन अथवा वेल्ड किया हुआ, रिवेट किया हुआ अथवा समान रूप से बंद किया गया हुआ)	7306	मेल्ट एंड पोर
20	लौह अथवा इस्पात के ट्यूब अथवा पाइप फिटिंग (उदाहरण के लिए, कनेक्टर/कप्लिंग, एल्बो स्लीव्स)	7307	मेल्ट एंड पोर
21	स्टेनलैस स्टील का अनियमित रूप से वूंड क्वाइल में बार्स और रॉड, हॉट रोल्ड	7221	मेल्ट एंड पोर
22	स्टेनलैस स्टील का वायर	7223	मेल्ट एंड पोर
23	इलेक्ट्रिकल स्टील सहित 600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले अन्य मिश्र धातु इस्पात का फ्लैट-रोल्ड इस्पात	7225	मेल्ट एंड पोर

24	इलेक्ट्रिकल स्टील सहित 600 मि.मी. से कम की चौड़ाई वाले अन्य मिश्रधातु इस्पात का फ्लैट-रोल्ड इस्पात	7226	मेल्ट एंड पोर
25	अन्य मिश्रधातु इस्पात का अनियमित रूप से वूंड क्वाइल में बार्स और रोड, हॉट रोल्ड	7227	मेल्ट एंड पोर
26	अन्य मिश्रधातु इस्पात का अन्य बार्स और रॉड्स; अन्य मिश्रधातु इस्पात का एंगल, शेप्स और सेक्शन्स; एलॉय अथवा गैर- मिश्रधातु इस्पात का हॉलो ड्रील बार्स और रॉड्स	7228	मेल्ट एंड पोर
27	लौह अथवा इस्पात की शीट पाइलिंग, चाहे ड्रील किया हुआ हो अथवा नहीं, चाहे पंच किया हुआ हो अथवा नहीं, चाहे असेम्बल किये हुए तत्वों से बना हुआ हो अथवा नहीं; लौह अथवा इस्पात का वेल्ड किया हुआ एंगल, शेप और सेक्शन्स	7301	मेल्ट एंड पोर
28	स्ट्रक्चर्स (9406 के शीर्ष का प्रीफेबरिकेटिड भवनों को छोड़कर) और स्ट्रक्चर्स का हिस्सा	7308	मेल्ट एंड पोर
29	300 से अधिक क्षमता का लौह अथवा इस्पात का किसी सामग्री (कम्प्रेस किए हुए अथवा तरलीकृत गैस को छोड़कर) के लिए भंडार, टैंक, वैट और समान कन्टेनर चाहे उसे लाइन किया गया हो अथवा नहीं या उसे हीट से इन्सुलेट किया गया हो अथवा नहीं लेकिन यांत्रिक अथवा तापीय उपक्रम से युक्त न हो	7309	मेल्ट एंड पोर
30	अधिकतक 300 लीटर की क्षमता का लौह अथवा इस्पात का किसी सामग्री (कम्प्रेस किए हुए अथवा तरलद्रवी गैस को छोड़कर) के लिए टैंक, कास्ट, ड्रम, केन, बॉक्स और समान कन्टेनर चाहे उसे लाइन किया गया हो अथवा नहीं या उसे हीट से इन्सुलेट किया गया हो अथवा नहीं लेकिन यांत्रिक अथवा तापीय उपक्रम से युक्त न हो	7310	मेल्ट एंड पोर
31	लौह अथवा इस्पात का कम्प्रेस किया हुआ अथवा तरलद्रवी गैस के लिए कन्टेनर	7311	मेल्ट एंड पोर
32	लौह अथवा इस्पात का स्टेंडिड वायर, रोप, केबल, प्लेटिड बैंड, स्लिंग और उसके समान वस्तु जिसे विद्युतीय रूप से इन्सुलेट न किया गया	7312	मेल्ट एंड पोर
33	लौह अथवा इस्पात का फेनसिंग के लिए उपयोग किये जाने वाला बार्ब्ड वायर; ट्विस्ट किया हुआ हूप अथवा सिंगल फ्लेट वायर, बार्स किया हुआ अथवा नहीं और लूज तरीके से ट्विस्ट किया हुआ डबल वायर	7313	मेल्ट एंड पोर
34	लौह अथवा इस्पात वायर का ड्रील, नेटिंग और फेनसिंग; लौह अथवा इस्पात संबंधित एक्सपैंडेड विस्तृत धातु	7314	मेल्ट एंड पोर
35	लौह अथवा इस्पात का चैन और उसका हिस्सा	7315	मेल्ट एंड पोर
36	लौह अथवा इस्पात का टैंकर, ग्रेपनेल्स और उसका हिस्सा	7316	मेल्ट एंड पोर

37	लौह एवं इस्पात की वस्तुएं	7317	मेल्ट एंड पोर
38	लौह एवं इस्पात की वस्तुएं	7318	मेल्ट एंड पोर
39	लौह एवं इस्पात की वस्तुएं	7319	मेल्ट एंड पोर
40	लौह अथवा इस्पात का स्प्रिंग और स्प्रिंग के लिए लीव्स	7320	मेल्ट एंड पोर
41	लौह अथवा इस्पात का स्टोव्स, रैंज, ग्रेड, कूकर (सेंट्रल हिटिंग के लिए सहायक बायलरों के साथ उन वस्तुओं सहित), बारबेक्यूज, ब्रेजियर्स, गैस रिंग, प्लेट वॉमर्स और समान गैर-विद्युतीय घरेलू उपकरण और उसका हिस्सा	7321	मेल्ट एंड पोर
42	लौह अथवा इस्पात का सेंट्रल हिटिंग के लिए रेडियेटर जिसे विद्युतीय रूप से हीट न किया गया हो और उसका हिस्सा; लौह अथवा इस्पात का हेयर हीटर और हॉट एयर वितरक जिसे विद्युतीय रूप से हीट न किया गया हो, फेन अथवा ब्लोअर जो मोटर से चलती हो और उसके हिस्से को शामिल करते हुए	7322	मेल्ट एंड पोर
43	लौह अथवा इस्पात का टेबल और समान घरेलू वस्तुएं और उसका हिस्सा	7323	मेल्ट एंड पोर
44	लौह अथवा इस्पात का सेनेटरी वेयर और उसके पार्टस	7324	मेल्ट एंड पोर
45	लौह अथवा इस्पात का अन्य कास्ट सामान	7325	मेल्ट एंड पोर
46	लौह अथवा इस्पात का विद्युतीय इस्पात और अन्य वस्तुएं	7326	मेल्ट एंड पोर
47	रेलवे अथवा ट्रामवे पेसेंजर कोच जो स्व-चालित नहीं है	8605	मेल्ट एंड पोर
48	रेलवे अथवा ट्रामवे माल वेन और वेगेन जो स्व-चालित नहीं है	8606	मेल्ट एंड पोर
49	रेलवे अथवा ट्रामवे लोकोमोटिव का हिस्सा अथवा रोलिंग स्टॉक जैसे बोगिज, बिसल बोगिज, एक्सेल और फोर्ज्ड किया हुआ पहिया और उसका हिस्सा	8607	मेल्ट एंड पोर

परिशिष्ट- ख

लौह एवं इस्पात उत्पादों तथा पैकेज के लिए लागू न्यूनतम घरेलू मूल्य संवर्धन के लिए आयात किए जा सकने वाले पूंजीगत माल (गैर-संपूर्ण) की सांकेतिक सूची

क्र.सं.	संयंत्र/यूनिट पैकेज	पूंजीगत माल के लिए न्यूनतम घरेलू मूल्य संवर्धन (%)	आयात योग्य वस्तुएँ
1	**कच्चे माल की हैंडलिंग प्रणाली** (बाउंड्री लिमिट - वैगन टिपलर से संबंधित उपयोगकर्ता इकाइयों तक)	95%	बैरल कप्लिंग, हेवी ड्यूटी बियेरिंग, क्रेन रेल लुब्रिकेशन प्रणाली, स्लू रिंग बियरिंग्स, टोंग्स (विशेष), बियेरिंग आइसोलेशन प्रणाली (स्प्रिंग डैम्पर)।
2	**मिनरल बेनिफिशिएशन (लिमिट लौह अयस्क और कोयला) उपस्कर** (बाउंड्री लिमिट: क्रेशर हॉपर में आरओएम की प्राप्ति, विखंडन, पृथक्करण, अयस्क/कोयला प्रसंस्करण से लेकर अंतिम उत्पाद तैयार करना)	75%	• वेट हाई इंटेन्सिटी मैग्नेटिक सैपरेटर / हाई ग्रेडीअन्ट मैग्नेटिक सैपेरेटर • हैवी मीडिया साइक्लोन • जाइरेटरी क्रशर • स्पाइलर कंसंट्रेटर • ऑनलाइन ऐश एनालाइजर
3	**खनन मशीनरी** (बाउंड्री लिमिट: ड्रिलिंग, रेजिंग, हॉलेज और खदान की तैयारी के लिए उपस्कर)	80%	डम्पर (220 टन से अधिक पे लोड क्षमता), हाइड्रोलिक एक्सकेवेटर (10.5 क्यूबिक मीटर बकेट क्षमता से अधिक)
4	**कोक ओवन बैटरी** (दोनों टॉप चार्ज और स्टैम्प चार्ज) (कोयला बंकर से कोक डिस्चार्ज बकेट तक)	90%	एंकरेज सिस्टम के स्प्रिंग्स, सीओजी बूस्टर, स्टैम्पिंग ट्रेन, बॉन्डिंग प्रेस
5	**कोक ड्राई क्वेन्चिंग संयंत्र**	90%	कूलिंग चैम्बर के ट्विन फ्लू के लिए मिल फैन और मोटर

	(हॉट कोक प्राप्त करने वाली बेकट से लेकर कूलिंग चैम्बर निर्वहन ढलान तक)		विशेष रिफैक्ट्री
6	**उपोत्पाद संयंत्र** (**प्राथमिक गैस कूलर से स्वच्छ कोक ओवन गैस** के **नेटवर्क तक**)	90%	एग्जॉस्टर और मोटर, क्लॉज किल्न कैटलिस्ट का बर्नर टेल गैस विश्लेषक, पैलेटाइजेशन इकाई
7	**सिंटर संयंत्र उपस्कर** (बाउंड्री लिमिट - उत्पाद सिंटर बिन के नीचे वाइब्रो-फीडर हेतु कच्चे माल के लिए प्राप्त बिन)	75%	हाई इन्टेन्सिव मिक्सर और ग्रैनुलेटर इकाई, पैलेट कार, ड्राइव स्प्रोकेट, सिंटर मशीन के गियर बॉक्स के साथ मुख्य ड्राइव, स्लाइड रेल और कर्व्ड रेल, हॉट सिंटर ब्रेकर और ग्रिज़ली, एनुलर डिप रेल कूलर, सिंटर प्लांट एग्जॉस्टर अनुप्रयोग के लिए एलसीआई ड्राइव सिस्टम
8	**पेलेट संयंत्र उपस्कर** (बाउंड्री लिमिट - फ्लक्स और बाइंडर के लिए ग्राउंड हॉपर प्राप्त करना, बेल्ट कन्वेयर उत्पाद पेलेट बेल्ट कन्वेयर को आईओएफ फीडिंग)	85%	पैलेट कार, हाई इंटेंसिव मिक्सर, बॉलिंग डिस्क, वर्टिकल रोलर मिल, ड्राइव/डिस्चार्ज एंड स्प्रोकेट असेंबली, कर्व्ड रेल, स्लाइड रेल, सिंगल डेक रोलर स्क्रीन और डबल डेक रोलर स्क्रीन, इंड्यूरेशन मशीन ड्राइव असेंबली, लेवल-2 ऑटोमेशन
9	**ब्लास्ट फर्नेस उपस्कर** **बाउंड्री लिमिट:** **इनपुट:** • **कच्चा माल - संबंधित सामग्री** के बंकरों का ऊपरी भाग	70%	• बेल लेस टॉप गियर बॉक्स, ऊपरी सील डिवाइस जो ऊपरी सामग्री गेट और ऊपरी सील वाल्व को कवर करती है, निचली सील डिवाइस जो निचले सामग्री गेट और

	• **कोल्ड ब्लास्ट** - स्नॉर्ट वाल्व का इनलेट • **औद्योगिक जल** - बीएफ पंप हाउस **आउटपुट** • **गरम धातु - टारपीडो** लेडल **में भरी जाती है** • **ग्रेनुलेटिड स्लैग -** ग्रेनुलेटिड स्लैग **यार्ड के लिए**		निचले सील वाल्व को कवर करती है, ब्लीडर वाल्व • हार्थ रिफ्रैक्टरी (कार्बन ब्लॉक) • टॉप रिकवरी टर्बाइन सिस्टम (टीआरटी) • क्यू-स्टेव्स • एसजीआई स्टेव्स • कास्ट हाउस उपस्कर (मड गन, ड्रिलिंग मशीन और मुख्य ट्रॉफ मैनिपुलेटर) • प्रोब, प्रोफाइलोमीटर और स्टॉक स्तर सूचक (रडार टाईप) • गैस सफाई संयंत्र (एजीएस प्रणाली) • स्टोव सिस्टम - सिरेमिक बर्नर और तकनीकी वाल्व • अपशिष्ट ऊष्मा पुनर्प्राप्ति प्रणाली • टर्बो ब्लोअर • बॉल मिल • पीसीआई इंजेक्शन सिस्टम • लेवल-II ऑटोमेशन
10	**गैस आधारित प्रत्यक्ष रीडक्शन संयंत्र उपस्कर** **(**बाउंड्री लिमिट: डीआरआई रिएक्टर के शीर्ष पर कच्चे माल की प्राप्ति और ईएएफ में हॉट डीआरआई का डिस्चार्ज**)**	50%	• रिएक्टर चार्जिंग सिस्टम • रिएक्टर • रिएक्टर डिस्चार्जिंग प्रणाली

			• ईएएफ में नुमैटिक ट्रांसफर • ब्रिकेटिंग प्रणाली के लिए डिस्चार्च रूट • ब्रिकेटिंग फीडिंग सिस्टम • ब्रिकेटिंग प्रणाली • रिडक्शन गैस सर्किट • CO_2 निष्कासन इकाई • प्रक्रिया गैस हीटर • सुधारक प्रणाली • हीट रिकवरी प्रणाली • प्रोसेस गैस कम्प्रेसर • ब्लोअर्स • सील गैस प्रणाली • फ्लू गैस फैन/हॉट फैन • प्रक्रिया वाल्व • क्रिटिकल बेलोज • क्रिटिकल रिफ्रैक्ट्री • प्राकृतिक गैस शोधन पूर्व प्रणाली • लेवल-II ऑटोमेशन
11	**ऑक्सीजन संयंत्र 700 टीपीडी और उससे अधिक** (सीमा: ऑक्सीजन संयंत्र सीमा पर पानी, विद्युत)	30%	• मुख्य एयर कंप्रेसर • बूस्टर एयर कंप्रेसर • एक्सपेशन टरबाइन • रिबॉयलर

			• क्रायोजेनिक पंप • एएसयू के हीट विनिमय तत्व
12	**इस्पात निर्माण**		
12.1	**हॉट मेटल डी-डी-सल्फराइजेशन स्टेशन (एचएमडीएस) यूनिट के साथ को-इंजेक्शन प्रक्रिया** **(**ब्लास्ट फर्नेस (बीएफ) से गर्म धातु को टारपीडो लेडल या ओपन-टॉप लेडल में प्राप्त किया जाता है**,** "सल्फर (एस)" सामग्री को कम करने के लिए डीसल्फराइजेशन शोधन से गुजारा जाता है**,** और फिर बीओएफ कनवर्टर में स्थानांतरित किया जाता है**)**	75%	• इंजेक्शन लांस और सहायक उपकरणों के साथ स्वचालित सैंपलिंग इकाई • सहायक उपकरणों के साथ डी-स्लैगिंग मशीनें (स्लैग रेकिंग मशीन) • सहायक उपकरणों के साथ तापमान मापने और नमूना लेने के साधन
12.2	**हॉट मेटल डी-डी-सल्फराइजेशन स्टेशन (एचएमडीएस) यूनिट मैकेनिकल स्टिरर (केआर) प्रक्रिया के साथ** **(**ब्लास्ट फर्नेस (बीएफ) से गर्म धातु को टारपीडो लेडल या ओपन-टॉप लेडल में प्राप्त किया जाता है**,** "सल्फर (एस)" सामग्री को कम करने के लिए डीसल्फराइजेशन शोधन से गुजारा जाता है**,** और फिर बीओएफ कनवर्टर में स्थानांतरित किया जाता है)	70%	• सहायक उपकरणों के साथ इम्पेलर, इम्पेलर लिफ्टिंग और स्टीरिंग उपस्कर, गाइड फ्रेम • सहायक सुविधाओं के साथ डी-स्लैगिंग मशीनें (स्लैग रेकिंग मशीन) • सहायक उपकरणों के साथ तापमान मापने और नमूना लेने का साधन
12.3	**बेसिक ऑक्सीजन फर्नेस/एलडी ईकाई** [शोधित गर्म धातु को बीओएफ कनवर्टर में डाला जाता है**,** जहां इसे इस्पात में परिवर्तित करने के लिए प्रसंस्कृत किया जाता है**,** जिसकी फिर लैडल फर्नेस (एलएफ) में आपूर्ति की जाती है]	65%	• क्लैम्पिंग के साथ लांस बॉडी, लांस कैरिज, लांस गाइड, लांस होइस्ट और ट्रॉली, सहायक उपकरणों के साथ लांस कॉपर टिप्स। • आपातकालीन टिल्टिंग ड्राइव के लिए न्यूमेटिक मोटर्स।

			• ज्वाइंट के साथ बॉटम स्टिरिंग प्रणाली, वाल्व स्टेशन और रोटरी • सहायक उपकरणों के साथ ऑक्सीजन/आर्गन/नाइट्रोजन के लिए वाल्व स्टेशन • सहायक उपकरणों के साथ उप-लांस प्रणाली • सभी सहायक उपकरणों सहित कंटेनर प्रयोगशाला। • सहायक उपकरणों के साथ स्वचालित गैस कपलिंग (ऑटो कपलर)। • कनवर्टर रेकिंग मशीन। • कनवर्टर टैप होल बदलने की मशीन • रिफ्रैक्टरी निगरानी (लेजर) मशीन।
12.4	**इलेक्ट्रिक आर्क फर्नेस यूनिट** (प्राथमिक सामग्री जैसे स्क्रैप, डी.आर.आई., पिग आयरन और गर्म धातु को विद्युत ऊर्जा का उपयोग करके तरल इस्पात में परिवर्तित किया जाता है, जिससे कच्चे माल को पिघलाया और परिष्कृत किया जाता है)	70%	• सहायक उपकरणों के साथ इलेक्ट्रोड रेगुलेशन प्रणाली • फर्नेस ट्रांसफार्मर सहित हाई करंट प्रणाली • सहायक उपकरणों के साथ ऑक्सीजन और कार्बन इंजेक्शन प्रणाली • सहायक उपकरणों के साथ मैनुअल तापमान मापन और नमूनाकरण लांस

12.5	**लैडल फर्नेस यूनिट** [तरल इस्पात को वांछित ग्रेड प्राप्त करने के लिए संसाधित/शोधित किया जाता है और निरंतर कास्टिंग मशीन (सीसीएम) को आपूर्ति किए जाने से पहले बफर स्टॉक के रूप में रखा जाता है]	70%	• सहायक उपकरणों के साथ इलेक्ट्रोड विनियमन प्रणाली • सहायक उपकरणों के साथ मैनुअल तापमान मापन और नमूनाकरण लांस
12.6	**आरएच/आरएच-ओबी यूनिट** **[**आवश्यक विघटित गैस स्तर प्राप्त करने के लिए तरल इस्पात को डीगैस किया जाता है और फिर निरंतर कास्टिंग मशीन (सीसीएम) को आपूर्ति की जाती है]	65%	• सहायक उपकरणों के साथ गैस स्टिरिंग सिस्टम/लिफ्ट गैस स्टिरिंग सिस्टम वॉल्व स्टैंड • सहायक उपकरणों के साथ ऑक्सीजन लांस प्रणाली • सहायक उपकरणों के साथ हाइड्रिस मापन प्रणाली
12.7	**सतत कास्टिंग इकाई** (स्लैब कास्टर/ बिलेट/ ब्लूम राउंड/ कॉम्बी/ बीम ब्लैंक**)** [तरल इस्पात को निरंतर कास्टिंग मशीन **(**सीसीएम) में स्लैब**,** बिलेट या ब्लूम में ढाला जाता है]	65%	• सहायक उपकरणों सहित लैडल स्लैग डिटेक्शन प्रणाली • कॉपर ट्यूब और प्लेट, मोल्ड ऑसीलेशन सिलेंडर। • रोटरी यूनियन। • सहायक उपकरणों सहित सतत तापमान माप प्रणाली। • सहायक उपकरणों के साथ टॉर्च कटिंग मशीन/ आपातकालीन टॉर्च कटर • सहायक उपकरणों सहित विद्युत ड्राइव सिस्टम सहित डिबुरर मशीन • मार्किंग मशीन।

			• सहायक उपकरणों सहित रोल गैप चेकर • सहायक उपकरणों के साथ इलेक्ट्रोमैग्नेटिक स्टिरर (ईएमएस)/इलेक्ट्रोमैग्नेटिक ब्रेकिंग (ईएमबीआर) प्रणाली
13	**फ्लैट उत्पाद मिल्स**		
13.1	**हॉट स्ट्रिप मिल्स/ प्लेट मिल** (बाउंड्री लिमिट: सहायक उपकरणों सहित) स्लैब यार्ड से डिस्पैच बे तक)	50%	• डी-स्केलर, मिल स्टैंड, बेड प्लेट, बैकअप रोल, वर्क रोल, मिल स्पिंडल, चॉक्स, एजीसी सिलेंडर, बेंडिंग ब्लॉक और सिलेंडर, शियर, डाउन कॉइलर, एंटी-फ्रिक्शन रोल नेक बेयरिंग, ऑयल फिल्म बेयरिंग, मिल रिड्यूसर, लोड सेल, थिकनेस गॉज, प्रोफाइल गॉज, लेवलर, रोल ग्राइंडिंग मशीन, कॉइल मार्किंग मशीन, प्लेट मार्किंग मशीन, मिल स्टैंड मोटर्स और मिल स्टैंड एमवी ड्राइव सिस्टम, ऑटोमेशन सिस्टम आदि।
13.2	**सीआरएम (पीएलटीसीएम)** (बाउंड्री लिमिट: पिकलिंग लाइन प्रवेश से मिल निकास तक)	50%	• वेल्डिंग मशीन, टेंशन लेवलर, मिल स्टैंड, बैकअप रोल, एंटीफ्रिक्शन बीयरिंग, ऑयल फिल्म बीयरिंग, रोल चॉक्स, रोल फोर्स सिलेंडर, रोल बेंडिंग और रोल शिफ्टिंग सिलेंडर, मिल स्पिंडल, लोड सेल, पोजिशन ट्रांसड्यूसर, इलेक्ट्रोस्टेटिक ऑइलर, साइड ट्रिमर, स्टीयरिंग सिस्टम, सरफेस इंस्पेक्शन सिस्टम, थिकनेस गेज, लेजर

			स्पीड गेज, टेंसियोमीटर, फ्लैटनेस गॉज, टेंशन रील, मिल रिड्यूसर, मिल स्टैंड मोटर्स और मिल स्टैंड एमवी ड्राइव सिस्टम, ऑटोमेशन सिस्टम आदि।
13.3	**सीआरएम (एचडीजीएल)** (बाउंड्री लिमिट: टेम्पर मिल और टेंशन लेवलर सहित एचडीजीएल में प्रवेश से निकास तक)	60%	• वेल्डिंग मशीन, रेडिएंट ट्यूब फर्नेस, जेट कूलिंग सिस्टम, इंडक्शन हीटिंग के साथ कोटिंग पॉट, पॉट रोल, एयर नाइफ वाइपिंग सिस्टम, टेंशन लेवलर, विड्थ गॉज, थिकनेस गेज, कोटिंग मोटाई गॉज, लोड सेल, रोल फोर्स सिलेंडर, मिल स्टैंड मोटर्स और मिल स्टैंड ड्राइव सिस्टम, ऑटोमेशन सिस्टम, आदि।
13.4	**सीआरएम (एसपीएम)** (बाउंड्री लिमिट: एसपीएम में प्रवेश से निकास तक)	50%	• मिल स्टैंड, बैकअप रोल, एंटीफ्रिक्शन बीयरिंग, ऑयल फिल्म बीयरिंग, रोल चॉक्स, रोल फोर्स सिलेंडर, मिल स्पिंडल, इलेक्ट्रोस्टेटिक ऑइलर, कॉइल मार्किंग सिस्टम, लोड सेल, थिकनेस गॉज, मिल स्टैंड मोटर्स और मिल स्टैंड एमवी ड्राइव सिस्टम, ऑटोमेशन सिस्टम, आदि।
13.5	**सीआरएम (बेल एनीलिंग फर्नेस)** (बाउंड्री लिमिट: फर्नेस बेस से पोस्ट शीतलन उपस्कर तक)	55%	• फर्नेस, स्वचालन प्रणाली, आदि।

13.6	**सीआरएम (कलर कोटिंग लाइन)** (बाउंड्री लिमिट: सीसीएल में प्रवेश से निकास तक)	80%	• कोटर, कोटिंग थिकनेस गेज, डिजिटल प्रिंटर, टेंशन लेवलर, स्वचालन आदि।
14	**लॉन्ग उत्पाद मिल्स**		
14.1	**बारमिल/डब्लूआरएम/एमएम/एलएसएम** (बाउंड्री लिमिट: फर्नेस प्रवेश से लेकर प्रेषण तक)	75%	• फास्ट फिनिशिंग ब्लॉक, रोल टर्निंग लेथ, प्रोफाइल गेज, स्वचालन प्रणाली आदि।
14.2	**रेल मिल/भारी संरचनात्मक मिल** (बाउंड्री सीमा: सामग्री हैंडलिंग को छोड़कर फर्नेस प्रवेश से लेकर रेल वेल्डिंग संयंत्र के निकास तक)	45%	• मिल स्टैण्ड, मिल मोटर एवं ड्राइव सिस्टम, हीट ट्रीटमेंट सुविधा, स्ट्रेटनिंग मशीन, एनडीटी सुविधाएं, वेल्डिंग मशीन, प्रोफाइल गेज, हॉट सॉ, कोल्ड सॉ, हॉट मार्किंग मशीन, रोल टर्निंग लेथ, सॉ ग्राइंडिंग मशीन, स्वचालन प्रणाली सिस्टम आदि।
15	**व्हील संयंत्र** (तैयार पहिये के लिए राउंड/इनगोट की प्राप्ति)	30%	• सर्कुलर सॉ, फोर्जिंग प्रेस, व्हील रोलिंग मिल, व्हील डिशिंग प्रेस, व्हील स्टैम्पिंग मशीन, रिम स्पैइंग मशीन, मोबाइल चार्जर, (हैंडलिंग रोबोट), मशीनिंग सुविधाएं, परीक्षण सुविधाएं, स्वचालन प्रणाली आदि।
16	**रिफ्रैक्टरी ब्रिक** (कच्चे माल की प्राप्ति से लेकर तैयार ब्रिक तक)	50%	• हाइड्रोलिक प्रेस
17	**इलेक्ट्रिकल** (विद्युत गुणवत्ता प्रणाली)	30%	• एमवी स्टेटकॉम (स्टेटिक सिंक्रोनस कम्पेन्सेटर) प्रणाली

परिशिष्ट-ग

लौह एवं इस्पात क्षेत्र में स्वदेशी प्रौद्योगिकियों को बढ़ावा देना

1) **उद्देश्य:**
इस्पात विनिर्माण के सभी चरणों में स्वदेशी प्रौद्योगिकियों को अपनाने, विकास और विस्तार को प्रोत्साहित करके भारतीय लौह एवं इस्पात क्षेत्र में आत्मनिर्भरता को बढ़ावा देना।

2) **विषय क्षेत्र:**
यह नीति इस्पात बनाने या इस्पात विनिर्माण संयंत्र स्थापित करने वाले केन्द्रीय सार्वजनिक क्षेत्र के उद्यमों पर लागू होती है।

3) **नीति निदेश:**

3.1 ऐसे मामले जहां पहले की इंजीनियरिंग और आपूर्ति के लिए प्रौद्योगिकी और प्रमाण उपलब्ध हैं, लेकिन वर्तमान क्षमता आवश्यकता से मेल नहीं खाते हैं, ऐसे मामलों में स्वदेशी प्रौद्योगिकी प्रदाताओं के लिए निम्नलिखित शर्तें लागू होंगी:

3.1.1 उत्पादन क्षमता प्रस्तावित संयंत्र की क्षमता का 30% होगी

3.1.2 विक्रेताओं के साथ स्पष्ट गठजोड़ की उपलब्धता

3.1.3 प्रस्तावित संयंत्र की क्षमता के कम से कम 75% के लिए परियोजनाओं की विस्तृत इंजीनियरिंग का अनुभव

3.2 ऐसे मामले जहां प्रौद्योगिकी उपलब्ध है, लेकिन पहले आपूर्ति के लिए कोई संदर्भ उपलब्ध नहीं है, ऐसे मामलों में स्वदेशी प्रौद्योगिकी प्रदाताओं के लिए निम्नलिखित शर्तें लागू होंगी:

3.2.1 स्वदेशी प्रौद्योगिकी आपूर्तिकर्ता ने प्रस्तावित परियोजना की कम से कम 75% विशेषताओं से मेल खाते हुए परियोजनाओं की विस्तृत इंजीनियरिंग की है

3.2.2 स्वदेशी प्रौद्योगिकी आपूर्तिकर्ता ने प्रस्तावित परियोजना की महत्वपूर्ण विशेषताओं से 100% मेल खाते हुए विस्तृत इंजीनियरिंग की है

3.2.3 विक्रेताओं के साथ स्पष्ट गठजोड़ की उपलब्धता

3.2.4 प्रौद्योगिकी उपलब्धता के प्रमाणिक साक्ष्य (अन्य पर्याप्त साक्ष्य पर आईपीआर)

4) **कार्यान्वयन निरीक्षण:**

इस्पात मंत्रालय द्वारा गठित स्थायी समिति कार्यान्वयन की निगरानी करेगी, विवादों का समाधान करेगी तथा पात्रता एवं प्रोत्साहन मानदंडों को समय-समय पर अद्यतन करेगी।

प्रपत्र- 1

लौह एवं इस्पात उत्पादों/ पूंजीगत माल में घरेलू मूल्यवर्धन के संबंध में 100/- रुपए मूल्य के स्टाम्प पेपर पर दिए जाने के लिए स्व-प्रमाणन शपथ-पत्र हेतु प्रारूप

तारीख:

मैं _____ सुपुत्र, सुपुत्री, पत्नी, _____, निवासी _____ _____ एतद्द्वारा निष्ठापूर्वक निम्नानुसार वचन देता हूँ और घोषण करता हूँ:

कि मैं अधिसूचना सं. : _____ के माध्यम से जारी की गई भारत सरकार की नीति के नियम और शर्तों का पालन करने के लिए सहमत हूँ।

कि यहां नीचे दी गई सूचना मेरे सर्वोत्तम ज्ञान और विश्वास के अनुसार सही है और मैं घरेलू मूल्यवर्धन का आकलन करने के प्रयोजन से प्रापण एजेंसी(यों) के समक्ष संगत रिकार्ड प्रस्तुत करने का वचन देता हूं।

कि सभी इनपुट्स के लिए घरेलू मूल्यवर्धन जिसमें उक्त लौह एवं इस्पात उत्पाद शामिल हैं का सत्यापन मेरे द्वारा कर लिया गया है और मैं उसमें किये गये दावों की सत्यतता के लिए जिम्मेदार हूं।

कि इसमें उल्लिखित उत्पाद घरेलू मूल्यवर्धन सही नहीं पाये जाने और मूल्यवर्धन के लिए निर्धारित मानदंडों को पूरा न किये जाने की स्थिति में, घरेलू मूल्यवर्धन का आकलन करने के प्रयोजन से प्रापण एजेंसी(यों) के आकलन के आधार पर मैं 36 महीनों की अवधि के लिए किसी सरकारी निविदा के लिए अयोग्य ठहराया जाऊंगा। इसके अतिरिक्त मैं इस प्रकार के आकलन की सभी लागतों का वहन करूंगा।

कि मैंने अधिसूचना संख्या _____ जिसमें सरकारी अधिप्राप्ति में घरेलू स्तर पर निर्मित लौह एवं इस्पात उत्पादों को वरीयता दी गई है, में संदर्भित सभी शर्तों का पालन किया है और यह कि प्रापण एजेंसी को एतद्द्वारा अधिकार दिया जाता है कि वह मेरे ईएमडी को जब्त करे। यह भी वचन देता हूं कि मैं आकलन की लागत का भुगतान करूंगा और निविदा दस्तावेज में यथा उल्लिखित सभी शास्ति राशि का भुगतान करूंगा।

मैं 8 वर्षों की अवधि के लिए कम्पनी के रिकॉर्ड में निम्नलिखित सूचना रखने के लिए सहमत हूं और किसी सांविधिक प्राधिकारी को सत्यापन के लिए इसे उपलब्ध कराऊंगा।

i. बोलीदाता का नाम और ब्यौरा (पंजीकृत कार्यालय, विनिर्माण इकाई का स्थान, कानूनी प्रतिष्ठान की प्रकृति)

ii. वह तारीख जब यह प्रमाण पत्र जारी किया गया है।

iii. लौह एवं इस्पात उत्पाद जिसके लिए यह प्रमाण पत्र प्रस्तुत किया गया है।

iv. प्रापण एजेंसी जिसे यह प्रमाण पत्र प्रस्तुत किया गया है।

v. दावा की गई घरेलू मूल्यवर्धन की प्रतिशतता और क्या यह निर्धारित घरेलू मूल्यवर्धन के थ्रेशोल्ड वेल्यू को पूरा करता है।

vi. विनिर्माता(ओं) इकाई का नाम और संपर्क विवरण

vii. लौह एवं इस्पात उत्पादों की निवल बिक्री कीमत

viii. संयंत्र तक भाड़ा, बीमा और रखरखाव

ix. लौह एवं इस्पात उत्पादों का निर्माण करने के लिए उपयोग किए जाने वाले इनपुट इस्पात (आयातित) की सूची और कुल लागत मूल्य।

x. घरेलू स्तर पर इनपुट इस्पात की सूची और कुल लागत

xi. यदि इनपुट इन हाऊस नहीं हो, तो कृपया आपूर्तिकर्ताओं से प्राप्त घरेलू मूल्यवर्धन प्रमाणपत्र संलग्न करें।

xii. आयातित इनपुट इस्पात के लिए, सीआईएफ मूल्य के ब्रेक-अप के साथ भारतीय पोर्ट पर लैंडेड कोस्ट, शुल्क एवं कर, पोर्ट हैंडलिंग संबंधी शुल्क और अंतर्देशीय भाड़े की लागत का ब्यौरा।

(इकाई/फर्म का नाम) के लिए तथा की ओर से

अधिकृत हस्ताक्षरकर्ता (निदेशक बोर्ड द्वारा विधिवत अधिकृत किये जाने के लिए)

<नाम, पदनाम और संपर्क सं. की प्रविष्टि करें>

[फा. सं. 8(2)/2023-आई डी-I]

अभिजीत नरेंद्र, संयुक्त सचिव

MINISTRY OF STEEL

NOTIFICATION

New Delhi, the 26th May, 2025

G.S.R. 341(E).— In supersession of earlier Domestically Manufactured Iron & Steel Products Policy, the revised Domestically Manufactured Iron & Steel Products Policy-2025 for providing preference to Domestically Manufactured Iron & Steel Products in Government procurement is hereby published for general information.

POLICY FOR PROVIDING PREFERENCE TO DOMESTICALLY MANUFACTURED IRON & STEEL PRODUCTS IN GOVERNMENT PROCUREMENT- REVISED, 2025

1. **Background**

1.1. This policy provides preference for Domestically Manufactured Iron and Steel Products (DMI&SP) in Government procurement.

1.2. The policy applies to procurement of iron & steel products notified in Appendix A. In Appendix B, the minimum domestic content and an exempted list of capital goods for manufacturing iron & steel products which can be imported have been listed. Appendix C contains the policy for promoting the procurement of technology from the indigenous technology suppliers.

2. **Definitions**

2.1. **Bidder** may be a domestic/ foreign manufacturer of iron & steel or their selling agents/ authorized distributors/authorized dealers/ authorized supply houses or any other company engaged in the bidding of projects funded by Government agencies.

2.2. **Domestically Manufactured Iron & Steel Products** are those iron and steel products that are manufactured by entities that are registered and established in India, including in Special Economic Zones (SEZs).

2.3. **Domestic Manufacturer** is a manufacturer of iron & steel products conforming to guidelines in section 7 and the definition of 'manufacturer' as per the Central Excise Act.

2.4. **Domestic value addition** means the amount of value added in India which shall be the total value of the item to be procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value of the item to be procured, in percent. The 'domestic value addition' definition shall be in line with the DPIIT guidelines and shall be suitably amended in case of any changes by DPIIT in the future. For the purpose of this policy document, domestic value addition and local content have been used interchangeably.

$$\% \text{ Domestic value addition} = \frac{\{\text{Total value of the item to be procured (excluding net domestic indirect taxes)} - \text{The value of imported content in the item (including all customs duties)}\}}{\{\text{Total value of the item to be procured}\}} \times 100\%$$

2.5. **Finished Steel** shall mean flat and long products, which can be subsequently

processed into manufactured items.

2.6. **Government** for the purpose of the Policy means Government of India.

2.7. **Government agencies** include Government PSUs, Societies, Trusts, and Statutory bodies set up by the Government of India.

2.8. **Indigenous Technology:** A technology shall be deemed to be Indigenous technology if, at least 51 % of the entity's equity is held by Indian residents and the IPR is owned or co-owned by an Indian entity or licensed exclusively to them and the core engineering R&D, and project execution capabilities reside in India.

2.9. **L1** means the lowest tender or the lowest bid or the lowest quotation received in a tender, bidding process, or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

2.10. **MoS** shall mean Ministry of Steel, Government of India.

2.11. **Margin of purchase preference** means the maximum extent to which the price quoted by a domestic supplier may be above L1 for the purpose of purchase preference. In the case of DMI&SP policy, the margin of purchase preference shall be 20% for items in Appendix B.

2.12. **Melt & Pour** is defined as the steel that has been produced in a steel-making furnace and poured into its first solid shape. The location where this process takes place is called the country of melt and pour (COM). The COM is the original location where crude steel is first produced in a liquid state and poured into its first solid shape. The first solid shape can be a semi-finished product, like a slab, billet, ingot, or a finished steel mill product.

2.13. **Net Selling Price** shall be the invoiced price excluding net domestic taxes and duties.

2.14. **Semi-Finished Steel** shall mean Ingots, billets, blooms, and slabs, which can be subsequently processed into finished steel.

3. **Exclusions**

3.1. Waivers may be granted by the Ministry of Steel to all such Government procurements subject to the below conditions:

3.1.1. Where specific grades of steel are not manufactured in the country, or

3.1.2. Where the quantities as per the demand of the project cannot be met through domestic sources.

3.2. Exemption requests shall be submitted to the Standing Committee along with sufficient proof of unavailability of iron & steel products domestically.

4. **Standing Committee**

4.1. A Standing Committee chaired by the Secretary (Steel), shall oversee the implementation of the policy.

4.2. The Committee shall comprise of experts drawn from Industry/Industry

Association/Government Institution or Body/Ministry of Steel. The said Committee in MoS shall have the mandate for the following:

4.2.1. Monitor the implementation of the policy.

4.2.2. Review and notify the list of Iron & Steel products, the domestic content requirement criteria and policy directives as mentioned in Appendix A, Appendix B and Appendix C.

4.2.3. Issue necessary clarifications for implementation of the policy including grant of exclusions to procuring agencies as per Para 3.

4.2.4. Constitute a grievance redressal committee for preliminary examination of complaints related to implementation of this policy.

4.2.5. Issue directions for suitable action to Ministries/Departments concerned in case of non-compliance with this policy by the procuring agency and advise.

4.3. Wherever a procuring entity concludes that an unreasonably high price has been quoted by the sole bidder/manufacturer, the matter may be referred to the Committee. In such cases, the procuring entity would be required to substantiate its case with complete and thorough documentation.

4.4. Specifying foreign certifications/unreasonable technical specifications in bid document is a restrictive and discriminatory practice against local suppliers. If foreign certification is required to be stipulated because of non-availability of Indian Standards and/or for any other reason, the same shall be done only after written approval of the Committee.

5. **Applicability**

5.1. The policy applies to every Ministry or Department of Government and all agencies/entities under their administrative control and to projects funded by these agencies for the purchase of iron & steel products for government projects. All Central Sector Schemes (CS)/Centrally Sponsored Schemes (CSS) for which procurement is made by States and Local Bodies, come within the purview of this Policy if that project/ scheme is fully/partly funded by the Government of India.

5.2. The policy applies to public sector steel manufacturers and agencies/entities under their administrative control for purchase of capital goods (Appendix-B) for manufacturing iron & steel products.

5.3. Appendix-B contains the exemption list of capital goods used in manufacturing iron & steel products which can be imported, and the minimum domestic content requirement for respective packages. The domestic value addition for Capital Goods, as indicated, is subject to change; for example, if some capital goods components can be manufactured in the country, the domestic value addition percentage may go up.

5.4. A purchase preference of 20% is applicable for capital goods used in steel manufacturing. For example, if the lowest bidder (L1) for an importable capital good is a foreign company with a quoted price of INR 100 crores for the product package, under the policy, procurement preference of 20% will be applicable to a domestic

supplier of the same capital good.

5.5. Appendix-C contains directives and methodology for steelmaking CPSEs to procure from indigenous technology suppliers.

5.6. The policy shall apply to projects and non-projects where the total procurement value of iron and steel products (Appendix-A) in a contract is greater than Rs. 5 lakhs, on itemised basis.

5.7. No Global Tender Enquiry (GTE) shall be invited for tenders related to the procurement of iron and steel products (Appendix-A of the DMI&SP Policy). No Global Tender Enquiry (GTE) shall be invited for tenders related to the procurement of Capital Goods for manufacturing iron & steel products (Appendix-B of the DMI&SP Policy) having estimated value up to Rs. 200 Crore except with the approval of competent authority as designated by Department of Expenditure.

5.8. The policy applies to the purchase of iron & steel products by private agencies for fulfilling an EPC contract and/or any other requirement of a Ministry or Department of Government or their PSUs.

6. **Tender procedure for procurement**

6.1. Procuring agencies shall follow standard procurement procedures, in accordance with instructions of the Ministry of Finance and CVC while adhering to DMI&SP policy.

6.2. The tender document, for procurement of both Goods as well as for EPC contracts, should explicitly outline the qualification criteria for adherence to the requirement as mentioned in Appendix A and Appendix B.

6.3. Domestic manufacturers of products under Appendix-A and Appendix-B shall self-certify the local content as per form-1 placed in the policy, at the time of bidding.

6.4. Bidders who are selling agents/authorized distributors/authorized dealers/authorized supply houses of the domestic manufacturers of iron & steel products, covered by Appendix-A, are eligible to bid with self- certification on behalf of the domestic manufacturers under the policy, subject to the bidder furnishing an authorisation certificate issued by the domestic manufacturer at the time of delivery.

6.5. For products covered under Appendix B of the DMI&SP policy, the bidder shall furnish certification issued by the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) declaring that the capital goods to be used in iron & steel industry are domestically manufactured in terms of the domestic value addition prescribed.

6.6. If Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, due to restrictive tender conditions which have direct or indirect effect of barring Indian companies such as registration in the procuring country, execution of projects of specific value in the procuring country etc., it shall provide such details to the procuring entities for appropriate reciprocal action.

6.7. Entities of countries that have been identified by the Ministry of Steel as not allowing

Indian companies to participate in their Government procurement for any item related to the Ministry of Steel shall not be allowed to participate in Government procurement in India for all items related to Ministry of Steel, except for the list of items published by Ministry of Steel permitting their participation.

6.8. The stipulation above shall be part of all tenders including those on GeM portal invited by the Central Government procuring entities.

6.9. In case restrictive or discriminatory conditions against domestic suppliers are included in bid documents, an inquiry shall be conducted by the Administrative Department undertaking the procurement (including procurement by any entity under its administrative control) to fix responsibility for the same. Thereafter, appropriate action, administrative or otherwise, shall be taken against erring officials of procurement entities under relevant provisions. Intimation on all such action shall be sent to the Standing Committee under the DMI&SP policy.

6.10. A supplier debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities.

6.11. In case, the matter is referred to the Ministry of Steel, the grievance redressal committee set up under the MoS shall dispose of the complaint within 4 weeks of its reference and receipt of all documents from the bidder after taking into consideration, the view of the Government Agency. The bidder shall be required to furnish the necessary documentation in support of domestic value addition claimed in iron & steel products to the grievance redressal committee under MoS within 2 weeks of the reference of the matter.

6.12. Procuring agency shall define the penalties, in case of a wrong declaration by the bidder of the prescribed domestic value addition, in the tender document. The penalties may include forfeiting of the EMD, other financial penalties, and blacklisting of such manufacturer/service provider etc., in terms of extant rules.

7. **Implementation monitoring by the Ministry of Steel**

7.1. The policy provisions shall be applicable for 5 years from the date of publication and may further be extended at the discretion of the Ministry of Steel.

7.2. MoS shall be the nodal ministry to monitor the implementation of the policy.

7.3. Agencies covered under DMI&SP policy shall send declaration on a quarterly basis indicating the extent of compliance to the policy and reasons for non-compliance thereof, during the preceding financial year.

Appendix-A

List of iron and steel products which can only be procured from domestic sources

Sl. No.	Iron & Steel Products	HS code	Condition
1	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot rolled, not clad, plated or coated	7208	Melt & Pour
2	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, cold rolled (cold-reduced), not clad, plated or coated	7209	Melt & Pour
3	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated	7210	Melt & Pour
4	Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, not clad, plated or coated	7211	Melt & Pour
5	Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, clad, plated or coated	7212	Melt & Pour
6	Bars and rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel	7213	Melt & Pour
7	Other bars and rods of iron or non-alloy steel, not further worked than forged, hot rolled, hot-drawn or hot-extruded, but including those twisted after rolling	7214	Melt & Pour
8	Other bars and rods of iron or non-alloy steel	7215	Melt & Pour
9	Angles, shapes and sections of iron or non-alloy steel	7216	Melt & Pour
10	Wire of iron or non-alloy steel	7217	Melt & Pour
11	Flat-rolled products of stainless steel, of a width of 600 mm or more	7219	Melt & Pour
12	Flat-rolled products of stainless steel, of a width of less than 600 mm	7220	Melt & Pour
13	Other bars and rods of stainless steel; angles, shapes and sections of stainless steel	7222	Melt & Pour
14	Wire of other alloy steel	7229	Melt & Pour
15	Rails, railway or tramway track construction material of iron or steel	7302	Melt & Pour
16	Tubes, pipes and hollow profiles, of cast iron	7303	Melt & Pour
17	Tubes, pipes and hollow profiles, seamless, of iron (other than cast iron) or steel	7304	Melt & Pour
18	Other tubes and pipes (for example, welded, riveted or similarly closed), having circular cross-sections, the external diameter of which exceeds 406.4 mm, of iron or steel	7305	Melt & Pour
19	Other tubes, pipes and hollow profiles (for example, open seam or welded, riveted or similarly closed), of iron or steel	7306	Melt & Pour
20	Tube or pipe fittings (for example, connectors/couplings, elbow sleeves), of iron or steel	7307	Melt & Pour
21	Bars and rods, hot-rolled, in irregularly wound coils, of stainless steel	7221	Melt & Pour
22	Wire of stainless steel	7223	Melt & Pour
23	Flat-rolled products of other alloy steel, of a width of 600 mm or more, including electrical steel	7225	Melt & Pour
24	Flat-rolled products of other alloy steel, of a width of less than 600 mm, including electrical steel	7226	Melt & Pour
25	Bars and rods, hot-rolled, in irregularly wound coils, of other alloy steel	7227	Melt & Pour

26	Other bars and rods of other alloy steel; angles, shapes and sections, of other alloy steel; hollow drill bars and rods, of alloy or non alloy steel	7228	Melt & Pour
27	Sheet piling of iron or steel, whether or not drilled, punched or made from assembled elements; welded angles, shapes and sections, of iron or steel	7301	Melt & Pour
28	Structures (excluding prefabricated buildings of heading 9406) and parts of structures	7308	Melt & Pour
29	Reservoirs, tanks, vats and similar containers for any material (other than compressed or liquefied gas), of iron or steel, of a capacity exceeding 300 whether or not lined or heat insulated, but not fitted with mechanical or Thermal equipment	7309	Melt & Pour
30	Tanks, casks, drums, cans, boxes and similar containers, for any material(other than compressed or liquefied gas), of iron or steel, of a capacity not exceeding 300L,whether or not lined or heat-insulated, but not fitted with mechanical or thermal equipment	7310	Melt & Pour
31	Containers for compressed or liquefied gas, of iron or steel	7311	Melt & Pour
32	Stranded wire, ropes, cables, plaited bands, slings and the like, of iron or steel, not electrically insulated	7312	Melt & Pour
33	Barbed wire of iron or steel; twisted hoop or single flat wire, barbed or not, and loosely twisted double wire, of a kind used for fencing, of iron or steel	7313	Melt & Pour
34	Grill, netting and fencing, of iron or steel wire; expanded metal of iron or steel	7314	Melt & Pour
35	Chain and parts thereof, of iron or steel	7315	Melt & Pour
36	Anchors, grapnels and parts thereof, of iron or steel	7316	Melt & Pour
37	Articles of iron and steel	7317	Melt & Pour
38	Articles of iron and steel	7318	Melt & Pour
39	Articles of iron and steel	7319	Melt & Pour
40	Springs and leaves for springs, of iron or steel	7320	Melt & Pour
41	Stoves,ranges,grates,cookers(includingthosewithsubsidiaryboilersforcentral heating), barbecues, braziers, gas-rings, plate warmers and similar non- electric domestic appliances, and parts thereof, of iron or steel	7321	Melt & Pour
42	Radiators for central heating, not electrically heated, and parts thereof, of iron or steel; air heaters and hot air distributors, not electrically heated, incorporating a motor-driven fan or blower, and parts thereof, of iron or steel	7322	Melt & Pour
43	Tables and similar house hold articles and parts thereof, of iron or steel	7323	Melt & Pour
44	Sanitary ware and parts thereof, of iron or steel	7324	Melt & Pour
45	Other cast articles of iron or steel	7325	Melt & Pour
46	Electrical steel and other articles of iron or steel	7326	Melt & Pour
47	Railway or tramway passenger coaches, not self-propelled	8605	Melt & Pour
48	Railway or tramway goods vans and wagons, not self-propelled	8606	Melt & Pour
49	Parts of railway or tramway locomotives or rolling-stock; such as bogies, bissel-bogies, axles and forged wheels, and parts thereof	8607	Melt & Pour

Appendix- B

Indicative list of Capital Goods (non-exhaustive) which can be imported for Manufacturing Iron & Steel products, and minimum Domestic content applicable for the package

S. no.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
1	**Raw Material Handling System** (Boundary Limit – from Wagon Tippler to respective user units)	95%	Barrel Couplings, Heavy Duty Bearings, Crane Rail Lubrication System, Slew Ring Bearings, Tongs (Special), Vibration Isolation System (Spring Damper).
2	**Mineral beneficiation (iron ore and coal) equipment** (Boundary Limit: from Receiving of ROM at the crusher hopper, comminution, segregation, ore/coal processing up to final product preparation)	75%	• Wet High Intensity Magnetic Separator / High Gradient Magnetic Separator • Heavy Media Cyclone • Gyratory Crusher • Spiral Concentrator • Online Ash Analyser
3	**Mining Machinery** (Boundary Limit: Equipment for drilling, raising, haulage, and mine preparation)	80%	Dumper (above 220 tons pay load capacity), Hydraulic Excavators (above 10.5 Cubic meter bucket capacity)
4	**Coke Oven Battery** (Both top charged & stamp charged) (From Coal bunker to coke discharge bucket)	90%	Springs of the anchorage systems, COG booster, stamping train, bonding press
5	**Coke Dry Quenching Plant** (From Hot coke receiving bucket to discharge chute of cooling chamber)	90%	Mill fan & Motor Special Refractory for Twin Flue of Cooling Chamber.
6	**By-Product Plant** (From Primary Gas cooler to clean coke oven gas up to the network)	90%	Exhauster & Motor, burner of the clause kiln Catalyst, Tail gas analyzer, Palletization unit.
7	**Sinter Plant Equipment** (Boundary Limit – Receiving Bin for Raw Material to Vibro-Feeder below Product Sinter Bin)	75%	High Intensive Mixer & Granulator Unit, Pallet cars, Drive Sprocket, Main Drive with Gear Box of sinter machine, slide rail & curved rail, Hot Sinter breaker and Grizzly, Annular Dip Rail Cooler, LCI Drive system for Sinter Plant Exhauster application
8	**Pellet Plant Equipment** (Boundary Limit – Receiving Ground Hopper for flux & Binder, Belt Conveyor feeding IOF to product pellet belt conveyor)	85%	Pallet car, High Intensive Mixer, Balling Discs, Vertical roller mill, Drive/discharge end Sprocket assembly, Curved rail, Slide rails, Single deck roller screen and Double deck roller screen, Induration Machine Drive assembly, Level-2 automation

9	**Blast Furnace Equipment** **Boundary Limit:** **Input:** • **Raw material**- Top of bunkers of respective **material** • **Cold Blast**- Inlet of the snort valve • **Industrial water**- BF pump house **Output** • **Hot Metal-** Filled in the torpedo ladle • **Granulated Slag-** to the granulated slag yard	70%	• Bell less top gear box, upper seal device covering upper material gate and upper seal valve, lower seal device covering lower material gate and lower seal valve, Bleeder valve • Hearth Refractory (carbon blocks) • Top Recovery Turbine system (TRT) • Cu-staves • SGI Staves • Cast house equipment (Mud gun, Drilling machine and main trough Manipulator) • Probes, Profilometer & Stock level indicator (radar type) • Gas cleaning plant (AGS system) • Stove system – ceramic burner & technological valve • Waste Heat Recovery system • Turbo blowers • Ball Mill • PCI Injection System • Level-II automation
10	**Gas based Direct Reduction Plant Equipment** (Boundary Limit: Receipt of raw material at the top of the DRI reactor & discharge of hot DRI to EAF)	50%	• Reactor charging system • Reactor • Reactor discharging system • Pneumatic transfer to EAF • Discharge route to briquetting system • Briquetting feeding system • Briquetting system • Reduction gas circuit • CO_2 removal unit • Process gas heater • Reformer system • Heat Recovery System • Process Gas Compressors • Blowers • Seal Gas System • Flue Gas Fan/ Hot Fan • Process valves • Critical bellows • Critical refractories

			• Natural Gas pre-treatment system • Level-II automation
11	**Oxygen Plant 700 tpd & Above** (Boundary limit: Water, Power at oxygen plant boundary)	30%	• Main Air Compressor • Booster Air Compressor • Expansion Turbine • Reboiler • Cryogenic Pumps • Heat exchange elements of ASU
12	**Steel Making**		
12.1	**Hot Metal De- De-Sulphurization Station (HMDS) Unit with Co-Injection Process** (Hot metal from the blast furnace (BF) is received in a torpedo ladle or open-top ladle, undergoes desulfurization treatment to reduce "Sulphur (S)" content, and is then transferred to the BOF converter)	75%	• Injection Lance and automatic sampling Unit with auxiliaries • De-slagging Machines (slag raking machine) with auxiliaries • Temp. measuring and sampling device with auxiliaries
12.2	**Hot Metal De- De-Sulphurization Station (HMDS) Unit with Mechanical Stirrer (KR) Process** (Hot metal from the blast furnace (BF) is received in a torpedo ladle or open-top ladle, undergoes desulfurization treatment to reduce "Sulphur (S)" content, and is then transferred to the BOF converter)	70%	• Impeller, Impeller lifting & stirring equipment, Guide Frame with auxiliaries • De-slagging Machines (slag raking machine) with auxiliary facilities • Temp. measuring and sampling device with auxiliaries
12.3	**Basic Oxygen Furnace / LD Unit** [Treated hot metal is poured into the BOF converter, where it undergoes processing to convert it into steel, which is then supplied to the ladle furnace (LF)]	65 %	• Lance body with clamping, Lance carriage, Lance guide, Lance hoist & trolley, Lance copper tips with auxiliaries. • Pneumatic motors for emergency tilting drive. • Bottom stirring system, valve station & rotary joint along with auxiliaries • Valve stations for oxygen/ argon/ nitrogen with auxiliaries • Sub-lance system with auxiliaries • Container lab with all auxiliaries. • Automatic gas coupling (auto coupler) with auxiliaries. • Converter wrecking machine. • Converter tap hole changing machine • Refractory monitoring (laser) machine.

12.4	**Electric Arc Furnace Unit** (Primary materials such as scrap, DRI, pig iron, and hot metal in combination are converted into liquid steel using electrical energy to melt and refine the raw materials)	70%	• Electrode regulation system with auxiliaries • High current system including furnace transformer • Oxygen & Carbon Injection System with auxiliaries • Manual Temp Measuring & sampling Lance with auxiliaries
12.5	**Ladle Furnace Unit** [Liquid steel is processed/ treated to achieve the desired grade and held as buffer stock before being supplied to the continuous casting machine (CCM)]	70%	• Electrode regulation system with auxiliaries • Manual Temp Measuring & sampling Lance with auxiliaries
12.6	**RH/ RH-OB Unit** [The liquid steel is degassed to achieve the required dissolved gas levels and then supplied to the continuous casting machine (CCM)]	65%	• Gas Stirring System/ Lift Gas Stirring System Valve Stand with auxiliaries • Oxygen Lance System with auxiliaries • Hydris Measurement System with auxiliaries
12.7	**Continuous Casting Unit** (Slab Caster/ Billet/ Bloom Round/ Combi/ Beam Blank) [The liquid steel is cast into slabs, billets, or blooms in the continuous casting machine (CCM)]	65%	• Ladle slag detection system complete with auxiliaries • Copper tube and Plate, Mould oscillation Cylinder. • Rotary Union. • Continuous temperature measuring system with auxiliaries. • Torch cutting machine/ Emergency torch cutter along with auxiliaries • Deburrer machine along with electrical drive system with auxiliaries • Marking machine . • Roll gap checker complete with auxiliaries • Electromagnetic Stirrer (EMS)/ Electromagnetic Braking (EMBr) system along with auxiliaries •
13	**Flat Product Mills**		
13.1	**Hot Strip Mills/ Plate Mill** (Boundary Limit: Slab yard to Dispatch Bay, including auxiliaries)	50%	• De-scalars, mill stand, bed plates, backup rolls, Work Rolls, mill spindles, chocks, AGC cylinders, bending blocks & cylinders, shears, down coilers, anti-friction roll neck bearings, oil film bearings, mill reducers, load cells, thickness gauge, profile gauge,

			width gauge, levelers, roll grinding machines, Coil Marking Machine, Plate Marking Machine, mill stand motors & mill stand MV drive system, automation system, etc.
13.2	**CRM (PLTCM)** (Boundary Limit: Pickling line entry to mill exit)	50%	• Welding machine, tension leveler, mill stands, backup rolls, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, roll bending and roll shifting cylinders, mill spindles, load cells, position transducers, Electrostatic Oiler, Side Trimmer, Steering System, Surface Inspection System, thickness gauges, laser speed gauge, tensiometer, Flatness Gauge, tension reel, mill reducers, mill stand motors & mill stand MV drive system, automation system etc.
13.3	**CRM (HDGL)** (Boundary Limit: entry to exit of HDGL including temper mill & tension leveler)	60%	• Welding machine, radiant tube furnaces, jet cooling system, coating pot with induction heating, pot rolls, air knife wiping system, tension leveler, width gauge, thickness gauge, coating thickness gauge, load cells, roll force cylinders, mill stand motors & mill stand drive system, automation system, etc.
13.4	**CRM (SPM)** (Boundary Limit: entry to exit of SPM)	50%	• Mill stands, backup rolls, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, mill spindles, Electrostatic Oiler, Coil Marking System, load cells, thickness gauge, mill stand motors & mill stand MV drive system, automation system, etc.
13.5	**CRM (Bell Annealing Furnace)** (Boundary Limit: From furnace bases to post cooling equipment)	55%	• Furnace, automation system, etc.
13.6	**CRM (Color Coating Line)** (Boundary Limit: Entry to exit of CCL)	80%	• Coater, Coating thickness gauge, digital printer, tension leveler, automation, etc.
14	**Long Product Mills**		
14.1	**Bar Mill/ WRM/MM/ LSM** (Boundary Limit: From furnace entry to dispatch)	75%	• Fast finishing blocks, Roll turning lathes, Profile Gauge, automation systems, etc.
14.2	**Rail Mill/ Heavy Structural Mill** (Boundary Limit: From furnace entry	45%	• Mill stands, mill motor & drive system, heat treatment facility,

	to exit of the rail welding plant excluding material handling)		straightening machine, NDT facilities, welding machine, Profile Gauge, Hot Saw, Cold Saw, Hot Marking Machine, Roll Turning Lathe, Saw Grinding Machine, automation system, etc.
15	**Wheel Plant** (receipt of round/ingot to finished wheel)	30%	• Circular saw, forging press, wheel rolling mill, wheel dishing press, wheel stamping machine, rim spaying machine, mobile chargers, (Handling Robots),machining facilities, testing facilities, automation system etc.
16	**Refractory Brick** (Receipt of raw material to finished brick)	50%	• Hydraulic Press
17	**Electrical** (Power Quality System)	30%	• MVSTATCOM • (Static Synchronous Compensator) System

Appendix-C

Promotion of Indigenous Technologies in Iron & Steel Sector

1) Objective:
To promote self-reliance in the Indian iron and steel sector by incentivizing the adoption, development, and scale-up of indigenous technologies across all stages of steel manufacturing.

2) Scope:
This policy applies to Central Public Sector Enterprises involved in steelmaking or putting up a steel manufacturing plant.

3) Policy Directives:

3.1 In cases where technology and proof for earlier engineering & supply is available but does not match the present capacity requirement, following conditions will be applicable for indigenous technology providers:

3.1.1 Production capacity reference to be 30% of the capacity of the proposed plant

3.1.2 Availability of demonstrable tie ups with the vendors

3.1.3 Experience of detailed engineering of projects for at least 75% of the capacity of the proposed plant

3.2 In cases where technology is available but no reference for earlier supply is available, following conditions will be applicable for indigenous technology providers:

3.2.1 The indigenous technology supplier has done detailed engineering of projects matching at least 75% of the features of the proposed project

3.2.2 The indigenous technology supplier has done detailed engineering matching 100% of the critical features of the proposed project

3.2.3 Availability of demonstrable tie ups with the vendors

3.2.4 Demonstrable evidence of technology availability(IPR on other sufficient evidence)

4) Implementation Oversight:

The Standing Committee constituted by Ministry of Steel shall monitor implementation, resolve disputes, and update the eligibility and incentive criteria periodically.

Form-1

Format for Affidavit of Self Certification regarding Domestic Value Addition in Iron & Steel Products/capital goods to be provided on Rs. 100/-Stamp Paper

Date:

I _____S/o,D/o,W/o,_____Resident of _Hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the policy of Government of India issued vide Notification No:_____.

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring agency (ies) for the purpose of assessing the domestic value addition.

That the domestic value addition for all inputs which constitute the said iron & steel products has been verified by me and I am responsible for the correctness of the claims made therein.

That in the event of the domestic value addition of the product mentioned herein is found to be incorrect and not meeting the prescribed value-addition criteria, based on the assessment of procuring agency (ies) for the purpose of assessing the domestic value-addition, I will be disqualified from any Government tender for a period of 36 months. In addition, I will bear all costs of such an assessment.

That I have complied with all conditions referred to in the Notification No…..…… wherein preference to domestically manufactured iron & steel products in Government procurement is provided and that the procuring agency (ies) is hereby authorized to forfeit and my EMD. I also undertake to pay the assessment cost and pay all penalties as specified in the tender document.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.

i. Name and details of the Bidder (Registered Office, Manufacturing unit location, nature of legal entity)

ii. Date on which this certificate is issued

iii. Iron & Steel Products for which the certificate is produced

iv. Procuring agency to whom the certificate is furnished

v. Percentage of domestic value addition claimed and whether it meets the threshold value of domestic value addition prescribed

vi. Name and contact details of the unit of the manufacturer(s)

vii. Net Selling Price of the iron & steel products

viii. Freight, insurance and handling till plant

ix. List and total cost value of input steel (imported) used to manufacture the iron & steel products

x. List and total cost of input steel which are domestically sourced.

xi. Please attach domestic value addition certificates from suppliers, if the input is not in house.

xii. For imported input steel, landed cost at Indian port with break-up of CIF value, duties & taxes, port handling charges and in land freight cost.

For and on behalf of (Name of firm/entity)
Authorized signatory (To be duly authorized by the Board of Directors)
<Insert Name, Designation and Contact No.>

[F. No. 8(2)/2023-ID-I]
ABHIJIT NARENDRA, Jt. Secy.

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असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)
PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

सं. 459] नई दिल्ली, सोमवार, जुलाई 28, 2025/श्रावण 6, 1947
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इस्पात मंत्रालय

अधिसूचना

नई दिल्ली, 25 जुलाई, 2025

सा.का.नि. 502(अ).— भारत के राजपत्र, असाधारण, भाग II, खंड 3, उपखंड (i),सा.का.नि. 341 (अ) के संदर्भ में दिनांक 26 मई, 2025 को प्रकाशित घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पाद नीति-2025 के परिशिष्ट-ग में निम्नलिखित संशोधन एतद्वारा सामान्य सूचना के लिए प्रकाशित किया जाता है:

परिशिष्ट-ग में खंड 3.3 को खंड 3.2.4 के नीचे इस प्रकार जोड़ा गया है:

3.3 ऐसे मामलों में जहाँ कोई भारतीय प्रौद्योगिकी उपलब्ध नहीं है, वहाँ किसी भारतीय सीपीएसई (प्रापण संस्था सहित) को तीन वर्षों के भीतर प्रशिक्षण और हैंडहोल्डिंग सहित प्रौद्योगिकी हस्तांतरित करने के लिए प्रतिबद्ध विदेशी प्रौद्योगिकी आपूर्तिकर्ता को, घरेलू मूल्यवर्धन की प्रतिशतता पर ध्यान दिए बिना श्रेणी-I आपूर्तिकर्ता माना जाएगा। इस मामले में, समय-समय पर संशोधित डीपीआईआईटी के सार्वजनिक अधिप्राप्ति (मेक इन इंडिया को वरीयता) आदेश में परिभाषित विदेशी प्रौद्योगिकी आपूर्तिकर्ता को खरीद वरीयता दी जाएगी।

[फा. सं. 8(2)/2023-आईडी-I]

अभिजीत नरेन्द्र, संयुक्त सचिव

MINISTRY OF STEEL

NOTIFICATION

New Delhi, the 25th July, 2025

G.S.R. 502(E).—The following amendment to Appendix-C of the Domestically Manufactured Iron & Steel Products Policy-2025, published in the Gazette of India, Extraordinary, Part II, Section 3, sub-section (i) vide G.S.R. 341(E), dated 26th May, 2025 is hereby published for general information:

Clause 3.3 is inserted below Clause 3.2.4 in Appendix-C as:

3.3 In cases where no Indian technology is available, a foreign technology supplier committing to transfer technology, including training and handholding to an Indian CPSE (including the procuring entity), within three years, shall be considered as deemed Class-I supplier irrespective of percentage of Domestic Value Addition. In this case, purchase preference shall be given to the foreign technology supplier as defined in DPIIT's Public Procurement (Preference to Make in India) Order amended from time to time.

[F. No. 8(2)/2023-ID-I]

ABHIJIT NARENDRA, Jt. Secy.

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असाधारण
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PART II—Section 3—Sub-section (i)

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इस्पात मंत्रालय

अधिसूचना

नई दिल्ली, 17 दिसम्बर, 2025

सा.का.नि. 904(अ).—घरेलू स्तर पर विनिर्मित पूर्ववर्ती लौह एवं इस्पात उत्पाद नीति के अधिक्रमण में, सरकारी अधिप्राप्ति में घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पादों को वरीयता प्रदान करने के लिए संशोधित घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पाद नीति-2025 को आम सूचना के लिए एतदद्वारा प्रकाशित किया जाता है।

सरकारी अधिप्राप्ति में घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पादों को वरीयता देने के लिए नीति - संशोधित, 2025

1. पृष्ठभूमि

1.1 यह नीति सरकारी अधिप्राप्ति में घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पादों (डीएमआईएंडएसपी) को वरीयता देती है।

1.2 यह नीति परिशिष्ट क में अधिसूचित लौह एवं इस्पात उत्पादों की खरीद, परिशिष्ट ख में सूचीबद्ध पूंजीगत वस्तुओं की खरीद और परिशिष्ट ग में स्वदेशी प्रौद्योगिकी आपूर्तिकर्ताओं से प्रौद्योगिकी पर लागू होती है।

2. परिभाषाएं

2.1 **बोलीदाता** लौह एवं इस्पात का कोई घरेलू/विदेशी विनिर्माता अथवा उनके बिक्री एजेंट/अधिकृत वितरक/अधिकृत डीलर/अधिकृत आपूर्ति गृह अथवा सरकारी एजेंसियों द्वारा वित्त पोषित परियोजनाओं में बोली लगाने में कार्यरत कोई अन्य कंपनी हो सकती है।

2.2 **घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पाद** वे लौह एवं इस्पात उत्पाद हैं जिनका विनिर्माण उन प्रतिष्ठानों द्वारा किया जाता है जो भारत में पंजीकृत और स्थापित हैं, जिसमें विशेष आर्थिक क्षेत्र (एसईजेड) शामिल हैं।

2.3 **घरेलू विनिर्माता** केंद्रीय माल और सेवा कर अधिनियम, 2017 की धारा 2(72) के अनुरूप एक विनिर्माता है।

2.4 **घरेलू मूल्य संवर्धन** का अर्थ है भारत में जोड़े गए मूल्य की राशि जो अधिप्राप्त की जाने वाली वस्तु के कुल मूल्य (शुद्ध घरेलू अप्रत्यक्ष करों को छोड़कर) में से अधिप्राप्त की जाने वाली वस्तु के कुल मूल्य के अनुपात के रूप में वस्तु में आयातित सामग्री के मूल्य (सभी सीमा शुल्कों सहित) को घटाकर प्रतिशत में प्राप्त होगी। 'घरेलू मूल्य संवर्धन' की परिभाषा डीपीआईआईटी दिशा-निर्देशों के अनुरूप होगी और भविष्य में डीपीआईआईटी द्वारा किसी भी बदलाव के मामले में इसे उपयुक्त रूप से संशोधित किया जाएगा। इस नीति दस्तावेज के उद्देश्य के लिए, घरेलू मूल्य संवर्धन और स्थानीय सामग्री का परस्पर उपयोग किया गया है।

% घरेलू मूल्य संवर्धन =

{अधिप्राप्त की जाने वाली वस्तु का कुल मूल्य (शुद्ध घरेलू अप्रत्यक्ष करों को छोड़कर) - वस्तु में आयातित सामग्री का मूल्य (सभी सीमा शुल्कों सहित)}

---------- X 100%

{अधिप्राप्त की जाने वाली वस्तु का कुल मूल्य}

2.5 **तैयार इस्पात** (फिनिश्ड स्टील) का तात्पर्य सपाट और लंबे उत्पादों से होगा, जिन्हें बाद में प्रसाधित कर विनिर्मित वस्तु बनाया जा सकता है।

2.6 इस नीति के प्रयोजन से **सरकार** का तात्पर्य भारत सरकार से है।

2.7 **सरकारी एजेंसियों** में सरकार के सार्वजनिक क्षेत्र के उपक्रम, भारत सरकार द्वारा स्थापित सोसायटी, ट्रस्ट और सांविधिक निकाय शामिल हैं।

2.8 **स्वदेशी प्रौद्योगिकी:** किसी प्रौद्योगिकी को स्वदेशी प्रौद्योगिकी माना जाएगा यदि, इकाई की कम से कम 51% इक्विटी भारतीय निवासियों के पास हो और आईपीआर का स्वामित्व या सह-स्वामित्व किसी भारतीय इकाई के पास हो या विशेष रूप से उन्हें लाइसेंस प्राप्त हो तथा मुख्य इंजीनियरिंग अनुसंधान एवं विकास और परियोजना निष्पादन क्षमताएं भारत में हों।

2.9 **एल1** का तात्पर्य निविदा अथवा अन्य अधिप्राप्ति अनुरोध के अनुसार मूल्यांकन प्रक्रिया में यथाघोषित निविदा, बोली लगाने संबंधी प्रक्रिया अथवा अन्य अधिप्राप्ति अनुरोधों में प्राप्त न्यूनतम निविदा अथवा न्यूनतम बोली अथवा न्यूनतम भाव से होगा।

2.10 **एमओएस** का आशय इस्पात मंत्रालय, भारत सरकार से है।

2.11 **खरीद वरीयता के मार्जिन** का तात्पर्य उस अधिकतम सीमा से है जिस सीमा तक किसी घरेलू आपूर्तिकर्ता द्वारा लगाई गई कीमत खरीद वरीयता के प्रयोजन से एल1 से अधिक हो। डीएमआईएंडएसपी नीति के मामले में, खरीद वरीयता का मार्जिन परिशिष्ट ख में शामिल मदों के लिए 20% होगा।

2.12 **मेल्ट एंड पोर** को एक ऐसे इस्पात के रूप में परिभाषित किया गया है जिसे इस्पात बनाने वाले फर्नेस में उत्पादित किया जाता है और इसे अपने पहले ठोस आकार में डाला जाता है। जिस स्थान पर यह प्रक्रिया होती है उसे मेल्ट एंड पोर (सीओएम) का उद्गम स्थल कहा जाता है। सीओएम वह मूल स्थान है जहाँ क्रूड इस्पात को पहली बार तरल अवस्था में उत्पादित किया जाता है और इसे अपने पहले ठोस आकार में डाला जाता है। मेल्ट एंड पोर (सीओएम) का देश भारत होना चाहिए। पहला ठोस आकार एक अर्ध-तैयार उत्पाद जैसे स्लैब, बिलेट, पिंड या एक तैयार इस्पात मिल उत्पाद हो सकता है।

2.13 **निवल बिक्री मूल्य** इन्वॉइस मूल्य होगा जिसमें निवल घरेलू कर और शुल्क शामिल नहीं होंगे।

2.14 **अर्ध-तैयार इस्पात** (सेमी-फिनिश्ड स्टील) का तात्पर्य इनगोट्स, बिलेट्स, ब्लूम्स और स्लेब्स से है, जिसे बाद में प्रसाधित कर तैयार इस्पात बनाया जा सकता है।

3. अपवर्जन

3.1 इस्पात मंत्रालय द्वारा इस प्रकार की सभी सरकारी अधिप्राप्ति के लिये निम्नलिखित शर्तों के अध्यधीन छूट प्रदान की जा सकती है।

3.1.1 जहां विशिष्ट ग्रेडों के इस्पात का विनिर्माण देश में नहीं किया जाता हो, अथवा

3.1.2 जहां परियोजना की मांग के अनुसार इन मात्राओं को घरेलू स्रोतों के माध्यम से पूरा नहीं किया जा सकता हो।

3.2 छूट संबंधी अनुरोध लौह एवं इस्पात उत्पादों की घरेलू स्तर पर अनुपलब्धता के पर्याप्त प्रमाण के साथ स्थायी समिति के समक्ष प्रस्तुत किए जाएंगे।

4. स्थायी समिति

4.1 सचिव (इस्पात) की अध्यक्षता में एक स्थायी समिति नीति के कार्यान्वयन को देखेगी।

4.2. इस समिति में उद्योग/उद्योग संघ/सरकारी संस्था अथवा निकाय/इस्पात मंत्रालय (एमओएस) से लिए गए विशेषज्ञ शामिल होंगे। इस्पात मंत्रालय में उक्त समिति के पास निम्नलिखित के लिए अधिदेश होगा:

4.2.1 नीति के कार्यान्वयन की निगरानी करना।

4.2.2 परिशिष्ट क, परिशिष्ट ख और परिशिष्ट ग में उल्लिखित लौह एवं इस्पात उत्पादों की सूची, घरेलू सामग्री आवश्यकता मानदंड और नीति निर्देशों की समीक्षा करना और उन्हें अधिसूचित करना।

4.2.3 पैरा 3 के अनुसार प्रापण एजेंसियों को अपवर्जन की स्वीकृति देने सहित इस नीति के कार्यान्वयन के लिए आवश्यक स्पष्टीकरण जारी करना।

4.2.4 इस नीति के कार्यान्वयन से संबंधित शिकायतों की प्रारंभिक जांच के लिए एक शिकायत निवारण समिति का गठन करना।

4.2.5 अधिप्राप्ति एजेंसी द्वारा इस नीति का अनुपालन न किए जाने की स्थिति में संबंधित मंत्रालयों/विभागों को उचित कार्रवाई के लिए निर्देश जारी करना और सलाह देना।

4.3 जहां भी प्रापण इकाई इस निष्कर्ष पर पहुंचती है कि उपलब्ध बोलीदाता/विनिर्माता द्वारा अनुचित रूप से उच्च मूल्य निर्धारित किया गया है, तो मामले को स्थायी समिति को भेजा जा सकता है। ऐसे मामलों में, प्रापण इकाई को अपने मामले को पूर्ण और विस्तृत दस्तावेज़ों के साथ प्रमाणित करना होगा।

4.4 बोली दस्तावेज़ में विदेशी प्रमाणन/अनुचित तकनीकी विनिर्देश निर्दिष्ट करना स्थानीय आपूर्तिकर्ताओं के विरुद्ध प्रतिबंधात्मक और भेदभावपूर्ण व्यवहार है। यदि भारतीय मानकों की अनुपलब्धता और/या किसी अन्य कारण से विदेशी प्रमाणन निर्धारित करना आवश्यक है, तो ऐसा समिति की लिखित स्वीकृति के बाद ही किया जाएगा।

5. प्रयोज्यता

5.1 यह नीति सरकार के प्रत्येक मंत्रालय अथवा विभाग और उनके प्रशासनिक नियंत्रणाधीन सभी एजेंसियों/इकाइयों तथा सरकारी परियोजनाओं के लिए लौह एवं इस्पात उत्पादों की खरीद हेतु इन एजेंसियों द्वारा वित्त पोषित परियोजनाओं पर लागू है। केन्द्रीय क्षेत्र की सभी योजनाएं (सीएस)/ केन्द्रीय प्रायोजित योजनाएं (सीएसएस) जिनके लिए राज्यों और स्थानीय निकायों द्वारा अधिप्राप्ति की जाती है, इस नीति की परिधि में आएंगी, यदि उस परियोजना/योजना को भारत सरकार द्वारा पूर्णत:/आंशिक रूप से वित्तपोषित किया जाता है।

5.2 यह नीति लौह एवं इस्पात उत्पादों के विनिर्माण के लिए पूंजीगत माल (परिशिष्ट-ख) की खरीद के लिए सार्वजनिक क्षेत्र के इस्पात विनिर्माताओं और उनके प्रशासनिक नियंत्रणाधीन एजेंसियों/निकायों पर लागू होती है।

5.3 परिशिष्ट-ख में लौह एवं इस्पात उत्पादों के विनिर्माण में उपयोग किए जाने वाले पूंजीगत माल की छूट संबंधी सूची शामिल है, जिन्हें आयात किया जा सकता है, तथा पैकेजों के लिए लागू न्यूनतम घरेलू सामग्री की आवश्यकता बताई गई है।

5.4 इस्पात विनिर्माण में उपयोग किए जाने वाले पूंजीगत माल के लिए 20% की खरीद वरीयता लागू है। उदाहरण के लिए, यदि आयात योग्य पूंजीगत माल के लिए न्यूनतम बोलीदाता (एल-1) कोई विदेशी

कंपनी है, जिसने उत्पाद पैकेज के लिए 100 करोड़ रुपये की कीमत लगाई है, तो नीति के तहत, समान पूंजीगत माल के घरेलू आपूर्तिकर्ता के लिए 20% की खरीद वरीयता लागू होगी।

5.5 परिशिष्ट-ग में इस्पात बनाने वाले सीपीएसई के लिए स्वदेशी प्रौद्योगिकी आपूर्तिकर्ताओं से खरीद करने के निर्देश और कार्यप्रणाली दी गई है।

5.6 यह नीति उन परियोजनाओं और गैर-परियोजनाओं पर लागू होगी, जहाँ किसी संविदा में लौह एवं इस्पात उत्पादों (परिशिष्ट-क) का कुल अधिप्राप्ति मूल्य मदवार आधार पर 5 लाख रुपये से अधिक है।

5.7 लौह एवं इस्पात उत्पादों की अधिप्राप्ति से संबंधित निविदाओं के लिए कोई वैश्विक निविदा इन्क्वायरी (जीटीई) आमंत्रित नहीं की जाएगी (डीएमआईएंडएसपी नीति का परिशिष्ट-क)। लौह एवं इस्पात उत्पादों के विनिर्माण जिनका अनुमानित मूल्य 200 करोड़ रु. तक हो, (डीएमआईएंडएसपी नीति के परिशिष्ट-ख) के लिए पूंजीगत माल की अधिप्राप्ति से संबंधित निविदाओं के लिए कोई वैश्विक निविदा इन्क्वायरी (जीटीई) व्यय विभाग द्वारा यथा नाम-निर्दिष्ट सक्षम प्राधिकारी के अनुमोदन के अलावा आमंत्रित नहीं की जाएगी।

5.8 यह नीति सरकार के मंत्रालय अथवा विभाग या उनके सार्वजनिक क्षेत्र के उपक्रमों की किसी ईपीसी संविदा और/अथवा अन्य आवश्यकता को पूरा करने के लिए निजी एजेंसियों द्वारा लौह एवं इस्पातों की अधिप्राप्ति पर लागू है।

6. अधिप्राप्ति के लिए निविदा प्रक्रिया

6.1 प्रापण एजेंसियां डीएमआईएंडएसपी नीति का पालन करते समय वित्त मंत्रालय और सीवीसी के अनुदेशों के अनुसार मानक अधिप्राप्ति संबंधी प्रक्रियाओं का पालन करेगी।

6.2 माल की अधिप्राप्ति के साथ-साथ ईपीसी संविदाओं के लिए निविदा दस्तावेज में परिशिष्ट क और परिशिष्ट ख में उल्लिखित आवश्यकताओं के अनुपालन के लिए योग्यता मानदंड को स्पष्ट रूप से रेखांकित किया जाना चाहिए।

6.3 विनिर्माताओं, बिक्री एजेंटो, अधिकृत वितरकों, अधिकृत डीलरों और अधिकृत आपूर्ति घरों सहित सभी बोलीदाता अपनी बोली के हिस्से के रूप में फॉर्म-1 जमा करेंगे, भले ही वे विनिर्माता हो या अन्य।

6.4 वे बोलीदाता जो परिशिष्ट-क के अंतर्गत आने वाले लौह एवं इस्पात उत्पादों के घरेलू विनिर्माताओं के विक्रय एजेंट/अधिकृत वितरक/अधिकृत डीलर/अधिकृत आपूर्ति घर हैं, वे नीति के अंतर्गत घरेलू विनिर्माताओं की ओर से स्व-प्रमाणन के साथ बोली लगाने के लिए पात्र हैं, बशर्ते कि बोलीदाता डिलीवरी के समय घरेलू विनिर्माता द्वारा जारी किया गया प्राधिकार प्रमाणपत्र प्रस्तुत करें।

6.5 डीएमआईएंडएसपी नीति के परिशिष्ट ख के अंतर्गत आने वाले उत्पादों के लिए बोलीदाता को कंपनी के सांविधिक लेखापरीक्षक या लागत लेखापरीक्षक (कंपनियों के मामले में) या किसी प्रैक्टिसिंग लागत लेखाकार या प्रैक्टिसिंग चार्टर्ड अकाउंटेंट (कंपनियों के अलावा आपूर्तिकर्ताओं के संबंध में) द्वारा जारी प्रमाणन प्रस्तुत करेगा, जिसमें यह घोषणा की गई होगी कि लौह एवं इस्पात उद्योग में

उपयोग किए जाने वाले पूंजीगत माल निर्धारित घरेलू मूल्य संवर्धन के अनुसार घरेलू स्तर पर विनिर्मित किए गए हैं।

6.6 यदि किसी वस्तु के भारतीय आपूर्तिकर्ताओं को किसी विदेशी सरकार द्वारा अधिप्राप्ति में भाग लेने और/या प्रतिस्पर्धा करने की अनुमति नहीं है, प्रतिबंधात्मक निविदा शर्तों के कारण, जिनका प्रत्यक्ष या अप्रत्यक्ष रूप से भारतीय कंपनियों पर प्रतिबंध है, जैसे अधिप्राप्ति करने वाले देश में पंजीकरण, अधिप्राप्ति करने वाले देश में विशिष्ट मूल्य की परियोजनाओं का निष्पादन आदि, तो वह उचित पारस्परिक कार्रवाई के लिए प्रापण संस्थाओं को ऐसे विवरण उपलब्ध कराएगा।

6.7 इस्पात मंत्रालय द्वारा उन देशों की संस्थाओं की पहचान की गई है, जो भारतीय कंपनियों को इस्पात मंत्रालय से संबंधित किसी भी वस्तु के लिए अपनी सरकारी अधिप्राप्ति में भाग लेने की अनुमति नहीं देते हैं, उन्हें इस्पात मंत्रालय से संबंधित सभी वस्तुओं के लिए भारत में सरकारी अधिप्राप्ति में भाग लेने की अनुमति नहीं दी जाएगी, सिवाय इस्पात मंत्रालय द्वारा प्रकाशित उन वस्तुओं की सूची के जो उन्हें भाग लेने की अनुमति देती हैं।

6.8 उपरोक्त शर्त जैम पोर्टल सहित केन्द्र सरकार की प्रापण संस्थाओं द्वारा आमंत्रित सभी निविदाओं का हिस्सा होगी।

6.9 यदि बोली दस्तावेजों में घरेलू आपूर्तिकर्ताओं के खिलाफ प्रतिबंधात्मक या भेदभावपूर्ण शर्तें शामिल की जाती हैं, तो अधिप्राप्ति करने वाले प्रशासनिक विभाग (इसके प्रशासनिक नियंत्रण के तहत किसी भी इकाई द्वारा अधिप्राप्ति सहित) द्वारा इसकी जिम्मेदारी तय करने के लिए जांच की जाएगी। इसके बाद, संबंधित प्रावधानों के तहत प्रापण संस्थाओं के दोषी अधिकारियों के खिलाफ प्रशासनिक या अन्यथा उचित कार्रवाई की जाएगी। ऐसी सभी कार्रवाई की सूचना डीएमआईएंडएसपी नीति के तहत स्थायी समिति को भेजी जाएगी।

6.10 इस आदेश के उल्लंघन के लिए किसी प्रापण इकाई द्वारा प्रतिबंधित आपूर्तिकर्ता प्रतिबंध की अवधि के दौरान किसी अन्य अधिप्राप्ति करने वाली इकाई द्वारा अधिप्राप्ति के लिए इस आदेश के तहत वरीयता के लिए पात्र नहीं होगा। ऐसी अन्य प्रापण संस्थाओं के लिए प्रतिबंध उस तारीख से प्रभावी होगा जिस दिन यह अन्य अधिप्राप्ति करने वाली संस्थाओं के संज्ञान में आता है।

6.11 यदि, इस मामले को इस्पात मंत्रालय के पास भेजा जाता है, तब इस्पात मंत्रालय के अधीन गठित शिकायत निवारण समिति सरकारी एजेंसी के दृष्टिकोण पर विचार करने के बाद बोलीदाता से सभी दस्तावेजों के प्राप्त होने और उसका संदर्भ भेजे जाने के 4 सप्ताह के भीतर शिकायत का निपटारा करेगी। बोलीदाता से यह अपेक्षित होगा कि वे इस मामले के संदर्भ के 2 सप्ताह के भीतर इस्पात मंत्रालय के अंतर्गत शिकायत निवारण समिति को लौह एवं इस्पात उत्पादों में दावा किए गए घरेलू मूल्यवर्धन के समर्थन में आवश्यक दस्तावेज प्रस्तुत करे।

6.12 निविदा दस्तावेज में निर्धारित घरेलू मूल्यवर्धन का बोलीदाता द्वारा गलत घोषणा किए जाने की स्थिति में प्रापण ऐजेंसी शास्ती को स्पष्ट रूप से परिभाषित करेगी। मौजूदा नियमों के अनुसार शास्ती में ऐसे विनिर्माता/ सेवा प्रदाता आदि की ईएमडी को जब्त करना, अन्य वित्तीय शास्ती लगाना और उसे ब्लैकलिस्ट किया जाना शामिल हो सकता है।

7. इस्पात मंत्रालय द्वारा कार्यान्वयन की निगरानी

7.1 इस नीति के प्रावधान प्रकाशन की तारीख से 5 वर्षों की अवधि के लिए लागू रहेंगे और इस नीति की अवधि को इस्पात मंत्रालय के विवेक पर और आगे बढ़ाया जा सकता है।

7.2 इस्पात मंत्रालय इस नीति के कार्यान्वयन की निगरानी करने के लिए नोडल मंत्रालय होगा।

7.3 डीएमआईएंडएसपी नीति के अंतर्गत सभी एजेंसियां तिमाही आधार पर घोषणा पत्र भेजेगी जिसमें पिछले वित्तीय वर्ष के दौरान इस नीति के अनुपालन की सीमा और उसके अनुपालन न किए जाने के कारणों को दर्शाया जायेगा।

अनुलग्नक-क

लौह एवं इस्पात उत्पादों की सूची जिनकी अधिप्राप्ति केवल घरेलू स्रोतों से की जा सकती है

क्र.सं.	लौह एवं इस्पात उत्पाद	एचएस कोड	स्थिति
1	600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात के फ्लैट रोल्ड उत्पाद, हॉट रोल्ड, क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ नहीं	7208	मेल्ट एंड पोर
2	600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात के फ्लैट रोल उत्पाद, कोल्ड रोल्ड (कोल्ड रिड्यूज्ड किया हुआ), क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ नहीं	7209	मेल्ट एंड पोर
3	600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात का फ्लैट रोल उत्पाद, क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ	7210	मेल्ट एंड पोर
4	600 मि.मी. से कम की चौड़ाई वाले लौह अथवा गैर-मिश्रधातु इस्पात का फ्लैट रोल उत्पाद, क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ नहीं	7211	मेल्ट एंड पोर
5	600 मि.मी. से कम की चौड़ाई का लौह अथवा गैर-मिश्रधातु इस्पात का फ्लैट रोल उत्पाद, क्लेड, प्लेट लगाया हुआ अथवा कोट किया हुआ	7212	मेल्ट एंड पोर
6	लौह एवं गैर-मिश्रधातु इस्पात का अनियमित रूप से वूंड क्वाइल में बार्स और रॉड, हॉट रोल्ड	7213	मेल्ट एंड पोर
7	लौह अथवा गैर-मिश्रधातु इस्पात के अन्य बार्स और रॉड्स जिसे फोर्ज किए जाने की तुलना में आगे अधिक वर्क नहीं किया हुआ, हॉट रोल्ड, हॉट ड्रॉन अथवा हॉट एक्सट्रूडेड परंतु रोलिंग के बाद उसे टिविस्ट किये जाने सहित	7214	मेल्ट एंड पोर
8	लौह अथवा गैर-मिश्रधातु इस्पात का अन्य बार्स एंड रॉड्स	7215	मेल्ट एंड पोर
9	लौह अथवा गैर-मिश्रधातु इस्पात का एंगल, शेप और सेक्शन्स	7216	मेल्ट एंड पोर
10	लौह अथवा गैर-मिश्रधातु इस्पात का वायर	7217	मेल्ट एंड पोर
11	600 मि.मी. अथवा उससे अधिक की चौड़ाई का स्टेनलैस इस्पात का फ्लेट रोल्ड इस्पात	7219	मेल्ट एंड पोर
12	600 मि.मी. से कम की चौड़ाई का स्टेनलैस इस्पात का फ्लैट रोल्ड इस्पात	7220	मेल्ट एंड पोर
13	स्टेनलैस स्टील के अन्य बार्स और रॉड्स; स्टेनलैस स्टील का एंगल शेप और सेक्शन्स	7222	मेल्ट एंड पोर
14	अन्य मिश्रधातु इस्पात के वायर	7229	मेल्ट एंड पोर
15	लौह अथवा इस्पात के रेल, रेलवे अथवा ट्रामवे ट्रेक निर्माण सामग्री	7302	50% घरेलू मूल्यवर्धन
16	कास्ट लौह के ट्यूब, पाइप और हॉलो पाइप	7303	50% घरेलू मूल्यवर्धन
17	लौह (कास्ट आयरन को छोड़कर) अथवा इस्पात के ट्यूब पाइप और हॉलो प्रोफाइल, सीमलैस	7304	50% घरेलू मूल्यवर्धन
18	लौह अथवा इस्पात के सर्कुलर क्रॉस सेक्शन वाले अन्य ट्यूब और पाइप (उदाहरण के लिए, वेल्ड किया हुआ, रिवेट किया हुआ अथवा	7305	50% घरेलू मूल्यवर्धन

	समान रूप से बंद किया हुआ), जिसकी बाहरी त्रिज्या 406.4 मि.मी. से अधिक हो		
19	लौह अथवा इस्पात के अन्य ट्यूब, पाइप और हॉलो प्रोफाइल (उदाहरण के लिए ओपन सीन अथवा वेल्ड किया हुआ, रिवेट किया हुआ अथवा समान रूप से बंद किया गया हुआ)	7306	50% घरेलू मूल्यवर्धन
20	लौह अथवा इस्पात के ट्यूब अथवा पाइप फिटिंग (उदाहरण के लिए, कनेक्टर/कप्लिंग, एल्बो स्लीव्स)	7307	50% घरेलू मूल्यवर्धन
21	स्टेनलैस स्टील का अनियमित रूप से वूंड क्वाइल में बार्स और रॉड, हॉट-रोल्ड	7221	मेल्ट एंड पोर
22	स्टेनलैस स्टील का वायर	7223	मेल्ट एंड पोर
23	इलेक्ट्रिकल स्टील सहित 600 मि.मी. अथवा उससे अधिक की चौड़ाई वाले अन्य मिश्रधातु इस्पात का फ्लैट-रोल्ड इस्पात	7225	मेल्ट एंड पोर
24	इलेक्ट्रिकल स्टील सहित 600 मि.मी. से कम की चौड़ाई वाले अन्य मिश्रधातु इस्पात का फ्लैट-रोल्ड इस्पात	7226	मेल्ट एंड पोर
25	अन्य मिश्रधातु इस्पात का अनियमित रूप से वूंड क्वाइल में बार्स और रोड, हॉट-रोल्ड	7227	मेल्ट एंड पोर
26	अन्य मिश्रधातु इस्पात का अन्य बार्स और रॉड्स; अन्य मिश्रधातु इस्पात का एंगल, शेप्स और सेक्शन्स; एलॉय अथवा गैर- मिश्रधातु इस्पात का हॉलो ड्रील बार्स और रॉड्स	7228	मेल्ट एंड पोर
27	लौह अथवा इस्पात की शीट पाइलिंग, चाहे ड्रील किया हुआ हो अथवा नहीं, चाहे पंच किया हुआ हो अथवा नहीं, चाहे असेम्बल किये हुए तत्वों से बना हुआ हो अथवा नहीं; लौह अथवा इस्पात का वेल्ड किया हुआ एंगल, शेप और सेक्शन्स	7301	50% घरेलू मूल्यवर्धन
28	स्ट्रक्चर्स (9406 के शीर्ष का प्रीफेबरिकेटिड भवनों को छोड़कर) और स्ट्रक्चर्स का हिस्सा	7308	50% घरेलू मूल्यवर्धन
29	300 से अधिक क्षमता का लौह अथवा इस्पात का किसी सामग्री (कम्प्रेस किए हुए अथवा तरलीकृत गैस को छोड़कर) के लिए भंडार, टैंक, वैट और समान कन्टेनर चाहे उसे लाइन किया गया हो अथवा नहीं या उसे हीट से इन्सुलेट किया गया हो अथवा नहीं लेकिन यांत्रिक अथवा तापीय उपक्रम से युक्त न हो	7309	50% घरेलू मूल्यवर्धन
30	अधिकतक 300 लीटर की क्षमता का लौह अथवा इस्पात का किसी सामग्री (कम्प्रेस किए हुए अथवा तरलद्रवी गैस को छोड़कर) के लिए टैंक, कास्ट, ड्रम, केन, बॉक्स और समान कन्टेनर चाहे उसे लाइन किया गया हो अथवा नहीं या उसे हीट से इन्सुलेट किया गया हो अथवा नहीं लेकिन यांत्रिक अथवा तापीय उपक्रम से युक्त न हो	7310	50% घरेलू मूल्यवर्धन
31	लौह अथवा इस्पात का कम्प्रेस किया हुआ अथवा तरलीकृत गैस के लिए कन्टेनर	7311	50% घरेलू मूल्यवर्धन
32	लौह अथवा इस्पात का स्टैंडिड वायर, रोप, केबल, प्लेटिड बैंड, स्लिंग और उसके समान वस्तु जिसे विद्युतीय रूप से इन्सुलेट न किया गया	7312	50% घरेलू मूल्यवर्धन
33	लौह अथवा इस्पात का फेनसिंग के लिए उपयोग किये जाने वाला बार्ब्ड वायर; ट्विस्ट किया हुआ हूप अथवा सिंगल फ्लेट वायर, बार्स	7313	50% घरेलू मूल्यवर्धन

	किया हुआ अथवा नहीं और लूज तरीके से ट्विस्ट किया हुआ डबल वायर		
34	लौह अथवा इस्पात वायर का ग्रिल, नेटिंग और फेनसिंग; लौह अथवा इस्पात संबंधित एक्सपैंडेड विस्तृत धातु	7314	50% घरेलू मूल्यवर्धन
35	लौह अथवा इस्पात का चैन और उसका हिस्सा	7315	50% घरेलू मूल्यवर्धन
36	लौह अथवा इस्पात का टैंकर, ग्रेपनेल्स और उसका हिस्सा	7316	50% घरेलू मूल्यवर्धन
37	लौह एवं इस्पात की वस्तुएं	7317	50% घरेलू मूल्यवर्धन
38	लौह एवं इस्पात की वस्तुएं	7318	50% घरेलू मूल्यवर्धन
39	लौह एवं इस्पात की वस्तुएं	7319	50% घरेलू मूल्यवर्धन
40	लौह अथवा इस्पात की स्प्रिंग और स्प्रिंग के लिए लीव्स	7320	50% घरेलू मूल्यवर्धन
41	लौह अथवा इस्पात के स्टोव्स, रैंज, ग्रेड, कूकर (सेंट्रल हिटिंग के लिए सहायक बॉयलरों के साथ उन वस्तुओं सहित), बारबेक्यूज, ब्रेजियर्स, गैस रिंग, प्लेट वॉमर्स और समान गैर-विद्युतीय घरेलू उपकरण और उसका हिस्सा	7321	50% घरेलू मूल्यवर्धन
42	लौह अथवा इस्पात का सेंट्रल हिटिंग के लिए रेडियेटर जिसे विद्युतीय रूप से हीट न किया गया हो और उसका हिस्सा; लौह अथवा इस्पात का हेयर हीटर और हॉट एयर वितरक जिसे विद्युतीय रूप से हीट न किया गया हो, फेन अथवा ब्लोअर जो मोटर से चलती हो और उसके हिस्से को शामिल करते हुए	7322	50% घरेलू मूल्यवर्धन
43	लौह अथवा इस्पात का टेबल और समान घरेलू वस्तुएं और उसका हिस्सा	7323	50% घरेलू मूल्यवर्धन
44	लौह अथवा इस्पात के सेनेटरी वेयर और उसके पार्टस	7324	50% घरेलू मूल्यवर्धन
45	लौह अथवा इस्पात के अन्य कास्ट सामान	7325	50% घरेलू मूल्यवर्धन
46	लौह अथवा इस्पात का विद्युतीय इस्पात और अन्य वस्तुएं	7326	50% घरेलू मूल्यवर्धन
47	रेलवे अथवा ट्रामवे पेसेंजर कोच जो स्व-चालित नहीं है	8605	50% घरेलू मूल्यवर्धन
48	रेलवे अथवा ट्रामवे माल वेन और वेगेन जो स्व-चालित नहीं है	8606	50% घरेलू मूल्यवर्धन
49	रेलवे अथवा ट्रामवे लोकोमोटिव का हिस्सा अथवा रोलिंग स्टॉक जैसे बोगिज, बिसल बोगिज, एक्सेल और फोर्ज्ड किया हुआ पहिया और उसका हिस्सा	8607	50% घरेलू मूल्यवर्धन

परिशिष्ट- ख

लौह एवं इस्पात उत्पादों के विनिर्माण के लिए आयात किए जा सकने वाले पूंजीगत माल (गैर-संपूर्ण) और पैकेज के लिए लागू न्यूनतम घरेलू सामग्री की सूची

क्र.सं.	संयंत्र/यूनिट पैकेज	पूंजीगत माल की न्यूनतम घरेलू सामग्री (%)	आयात योग्य वस्तुएँ
1	**खनन विकास के लिए उपस्कर** • क्रशिंग एवं स्क्रीनिंग संयंत्र • खनिज बेनिफिशियेशन (लौह अयस्क और कोयला) संयंत्र; (बाउंड्री लिमिट: क्रेशर हॉपर में आरओएम की प्राप्ति, विखंडन, पृथक्करण, अयस्क/कोयला प्रसंस्करण से लेकर अंतिम उत्पाद तैयार करना) • स्लाइम बेनिफिशियेशन • स्वचालित लोडिंग सुविधा • कन्वेयर प्रणाली	75%	• वेट हाई इंटेन्सिटी मैग्नेटिक सैपरेटर / हाई ग्रेडीअन्ट मैग्नेटिक सैपेरेटर • हैवी मीडिया साइक्लोन • जाइरेटरी क्रशर • स्पाइलर कंसंट्रेटर • ऑनलाइन ऐश एनालाइजर • बॉल/रॉड/एजी मिल (3.5मी व्यास से अधिक)
2	**खनन परिवहन** • स्लरी पाइपलाइन • लंबी दूरी की कन्वेयिंग प्रणाली	30%	• पीडी पंप • वॉल्व • विशिष्ट/रोप/पाइप कन्वेयर
3	**खदानों के लिए अन्य खनन मशीनरी और हैवी अर्थ मूविंग उपस्कर** (बाउंड्री लिमिट: ड्रिलिंग, रेजिंग, लैडिंग, हॉलेज और खदान तैयार करने के लिए उपस्कर)	लागू नहीं	• डम्पर (220 टन से अधिक पे लोड क्षमता), हाइड्रोलिक एक्सकेवेटर (9 क्यूबिक मीटर बकेट क्षमता से अधिक)
4	**पेलेट संयंत्र उपस्कर** (बाउंड्री लिमिट - फ्लक्स और बाइंडर के लिए ग्राउंड हॉपर प्राप्त करना, बेल्ट कन्वेयर उत्पाद पेलेट बेल्ट कन्वेयर को आईओएफ फीडिंग)	85%	• पैलेट कार, हाई इंटेंसिव मिक्सर, बॉलिंग डिस्क, वर्टिकल रोलर मिल, ड्राइव/डिस्चार्ज एंड स्प्रोकेट असेंबली, कर्व्ड रेल, स्लाइड रेल, सिंगल डेक रोलर स्क्रीन और डबल डेक रोलर स्क्रीन, इंड्यूरेशन मशीन ड्राइव असेंबली, लेवल-2 ऑटोमेशन

	लौह/इस्पात निर्माण		
5	**कच्चे माल की हैंडलिंग प्रणाली** (बाउंड्री लिमिट - वैगन टिपलर से संबंधित उपयोगकर्ता इकाइयों तक)	95%	• बैरल कप्लिंग, हेवी ड्यूटी बियेरिंग, क्रेन रेल लुब्रिकेशन प्रणाली, स्लियू रिंग बियरिंग्स, टोंग्स (विशेष), वाइब्रेशन आइसोलेशन प्रणाली (स्प्रिंग डैम्पर), हाइड्रॉलिक मोटर और हाइड्रॉलिक पंप (वैगन टिपलर, साइड आर्म चार्ज, स्टैकर सह रिक्लेमर, स्लियू स्टैकर में स्थापित) इलैक्ट्रॉनिक कार्ड, अनबैलेंस्ड मोटर, वैगन टिपलर का कैम लिमिट स्वीच।
6	**कोक ओवन बैटरी** (टॉप चार्ज और स्टैम्प चार्ज दोनों) (कोयला बंकर से कोक डिस्चार्ज बकेट तक)	90%	• एंकरेज सिस्टम के स्प्रिंग्स, सीओजी बूस्टर, स्टैम्पिंग ट्रेन, बॉन्डिंग प्रेस
7	**कोक ड्राई क्वेन्चिंग संयंत्र** (हॉट कोक प्राप्त करने वाली बेकट से कूलिंग चैम्बर के डिस्चार्ज श्यूट ढलान तक)	90%	• मिल फैन और मोटर, कूलिंग चैम्बर के ट्विन फ्लू के लिए विशेष रिफैक्ट्री
8	**उपोत्पाद संयंत्र** **(**प्राथमिक गैस कूलर से स्वच्छ कोक ओवन गैस के नेटवर्क तक**)**	90%	• एग्जॉस्टर और मोटर, क्लॉज किल्न का बर्नर, कैटलिस्ट, टेल गैस विश्लेषक, पैलेटाइजेशन इकाई
9	**सिंटर संयंत्र उपस्कर** (बाउंड्री लिमिट - उत्पाद सिंटर बिन के नीचे वाइब्रो-फीडर हेतु कच्चे माल के लिए रिसिविंग बिन)	75%	• हाई इन्टेन्सिव मिक्सर और ग्रैनुलेटर इकाई, पैलेट कार, ड्राइव स्प्रोकेट, सिंटर मशीन के गियर बॉक्स के साथ मुख्य ड्राइव, स्लाइड रेल और कर्व्ड रेल, हॉट सिंटर ब्रेकर और ग्रिज़ली, एनुलर डिप रेल कूलर, सिंटर प्लांट एग्जॉस्टर अनुप्रयोग के लिए एलसीआई ड्राइव सिस्टम • इगनिशन फर्नेस स्पेयर पार्ट्स (रिफैक्ट्री/नियंत्रण प्रणाल/बर्नर असेंबली) • इग्ज़ोस्टर (वेस्ट गैस फैन) और सिस्टम स्पेयर पार्ट्स

10	**ब्लास्ट फर्नेस उपस्कर** बाउंड्री लिमिट*:* **इनपुट*:*** • **कच्चा माल -** संबंधित सामग्री के बंकरों का ऊपरी भाग • **कोल्ड ब्लास्ट** - स्नॉर्ट वाल्व का इनलेट • **औद्योगिक जल** - बीएफ पंप हाउस **आउटपुट** • **हॉट मेटल -** टारपीडो लेडल में भरी जाती है • **ग्रेनुलेटिड स्लैग -** ग्रेनुलेटिड स्लैग यार्ड के लिए	70%	• बेल लेस टॉप गियर बॉक्स, ऊपरी सील डिवाइस जो ऊपरी सामग्री गेट और ऊपरी सील वाल्व को कवर करती है, निचली सील डिवाइस जो निचले सामग्री गेट और निचले सील वाल्व को कवर करती है, ब्लीडर वाल्व, टिलटिंग रॉकर, वियर लाइनर्स, गौगल वॉल्व, इक्वलाइजिंग एंड रीलीफ वॉल्व, श्यूट रोटेशन मोटर्स, डिस्ट्रीब्यूशन श्यूट, फीडर स्पाउट, श्यूट्स और फनल्स आदि। • हार्थ रिफ्रैक्टरी (कार्बन ब्लॉक) • टॉप रिकवरी टर्बाइन सिस्टम (टीआरटी) • क्यू-स्टेव्स • एसजीआई स्टेव्स • कास्ट हाउस उपस्कर (मड गन, ड्रिलिंग मशीन और मुख्य ट्रॉफ मैनिपुलेटर) • प्रोब, प्रोफाइलोमीटर और स्टॉक स्तर सूचक (रडार टाईप) • गैस सफाई संयंत्र (एजीएस प्रणाली) • स्टोव सिस्टम - सिरेमिक बर्नर और तकनीकी वाल्व • अपशिष्ट ऊष्मा पुनर्प्राप्ति प्रणाली • टर्बो ब्लोअर • बॉल मिल • पीसीआई इंजेक्शन सिस्टम • लेवल-II ऑटोमेशन • कॉपर प्लेट कूलर्स • ट्यूयेर कूलर्स • स्टोव टेकनोलॉजिकल वाल्व • एसजीपी का डीवाटरिंग व्हील • टोरपेडो लैडल कार चेन असेबली • डोम फिल्ड डंप वाल्वस • ट्यूयेर स्टाक असेंबली
11	**गैस आधारित डायरेक्ट रीडक्शन संयंत्र उपस्कर** **(**बाउंड्री लिमिट*:* डीआरआई रिएक्टर के शीर्ष पर कच्चे माल की प्राप्ति और ईएएफ में हॉट डीआरआई का डिस्चार्ज**)**	50%	• रिएक्टर चार्जिंग सिस्टम • रिएक्टर • रिएक्टर डिस्चार्जिंग प्रणाली • ईएएफ में नुमैटिक ट्रांसफर • ब्रिकेटिंग प्रणाली के लिए डिस्चार्च रूट • ब्रिकेटिंग फीडिंग सिस्टम

			• ब्रिकेटिंग प्रणाली • रिडक्शन गैस सर्किट • CO_2 निष्कासन इकाई • प्रक्रिया गैस हीटर • सुधारक प्रणाली • हीट रिकवरी प्रणाली • प्रोसेस गैस कम्प्रेसर • ब्लोअर्स • सील गैस प्रणाली • फ्लू गैस फैन/हॉट फैन • प्रोसेस वाल्व • क्रिटिकल बेलोज • क्रिटिकल रिफ्रैक्ट्री • प्राकृतिक गैस शोधन पूर्व प्रणाली • लेवल-II ऑटोमेशन
12	**ऑक्सीजन संयंत्र 700 टीपीडी और उससे अधिक** (बाउंड्री लिमिट: ऑक्सीजन संयंत्र सीमा पर पानी, विद्युत)	30%	• मुख्य एयर कंप्रेसर • बूस्टर एयर कंप्रेसर • एक्सपेशन टरबाइन • रिबॉयलर • क्रायोजेनिक पंप • एएसयू के हीट विनिमय तत्व • प्रेशर कॉलम • मुख्य कंडेंसर, लो प्रेशर कॉलम • क्रूड आर्गन कॉलम, शुद्ध आर्गन कॉलम और कंडेंसर के साथ कंडेंसर ब्लॉक • मुख्य हीट एक्सचेंजर, शुद्ध आर्गन इवापरेटर सब-कूलर • एलओएक्स-आइसी-प्रोसेस पंप • एलआइएन-आइसी-प्रोसेस पंप • एलएआर-ट्रांसफर -प्रोसेस पंप • डेंस फ्लूइड एक्सपेंडर • बूस्टर हीट एक्सचेंजर • पीपीयू के लिए मॉलिक्यूलर सीव्स स्विचिंग वाल्व • क्रिटिकल सेफ्टी वाल्व • स्पेशलाइज्ड वाल्व • कंट्रोल वाल्व • कोल्ड बॉक्स • कंट्रोल वाल्व जीओएक्स-प्रोडक्ट

			• कोल्ड बॉक्स के फ्लो मापने वाले उपकरण • एक्सपेंडर - ब्रेक जेनरेटर, फ्रीक्वेंसी कन्वर्टर्स
13	**इस्पात प्रसंस्करण**		
13.1	**हॉट मेटल डी-डी-सल्फराइजेशन स्टेशन (एचएमडीएस) यूनिट के साथ को-** **इंजेक्शन प्रक्रिया** (ब्लास्ट फर्नेस (बीएफ) से हॉट मेटल को टारपीडो लेडल या ओपन-टॉप लेडल में प्राप्त होता है "सल्फर(एस)" सामग्री को कम करने के लिए डीसल्फराइजेशन शोधन से गुजारा जाता है और फिर बीओएफ कनवर्टर में स्थानांतरित किया जाता है)	75%	• इंजेक्शन लांस और सहायक उपकरणों के साथ स्वचालित सैंपलिंग इकाई • सहायक उपकरणों के साथ डी-स्लैगिंग मशीनें (स्लैग रेकिंग मशीन) • सहायक उपकरणों के साथ तापमान मापने और नमूना लेने के साधन
13.2	**हॉट मेटल डी-डी-सल्फराइजेशन स्टेशन (एचएमडीएस) यूनिट मैकेनिकल स्टिरर (केआर) प्रक्रिया के साथ** (ब्लास्ट फर्नेस (बीएफ) से हॉट मेटल टारपीडो लेडल या ओपन-टॉप लेडल में प्राप्त होता है, "सल्फर (एस)" सामग्री को कम करने के लिए डीसल्फराइजेशन शोधन से गुजारा जाता है और फिर बीओएफ कनवर्टर में स्थानांतरित किया जाता है)	70%	• सहायक उपकरणों के साथ इम्पेलर, इम्पेलर लिफ्टिंग और स्टीरिंग उपस्कर, गाइड फ्रेम • सहायक सुविधाओं के साथ डी-स्लैगिंग मशीनें (स्लैग रेकिंग मशीन) • सहायक उपकरणों के साथ तापमान मापने और नमूना लेने का साधन
13.3	**बेसिक ऑक्सीजन फर्नेस/एलडी ईकाई** [शोधित हॉट मेटलको बीओएफ कनवर्टर में डाला जाता है, जहां इसे इस्पात में परिवर्तित करने के लिए प्रसंस्कृत किया जाता है, जिसकी फिर लैडल फर्नेस (एलएफ) में आपूर्ति की जाती है]	65%	• क्लैम्पिंग के साथ लांस बॉडी, लांस कैरिज, लांस गाइड, लांस होइस्ट और ट्रॉली, सहायक उपकरणों के साथ लांस कॉपर टिप्स। • आपातकालीन टिल्टिंग ड्राइव के लिए न्यूमेटिक मोटर्स। • ज्वाइंट के साथ बॉटम स्टिरिंग प्रणाली, वाल्व स्टेशन और रोटरी • सहायक उपकरणों के साथ ऑक्सीजन/आर्गन/नाइट्रोजन के लिए वाल्व

			स्टेशन • सहायक उपकरणों के साथ उप-ल्यांस प्रणाली • सभी सहायक उपकरणों सहित कंटेनर प्रयोगशाला। • सहायक उपकरणों के साथ स्वचालित गैस कपलिंग (ऑटो कपलर)। • कनवर्टर रेकिंग मशीन। • कनवर्टर टैप होल बदलने की मशीन • रिफ्रैक्टरी निगरानी (लेजर) मशीन। • कन्वर्टर शेल पार्ट्स, सस्पेंशन सिस्टम, रोटरी जॉइंट, स्लैग स्टॉपर और इसके कंट्रोल वाल्व • कन्वर्टर टिल्टिंग ड्राइव सिस्टम और सस्पेंशन सिस्टम, गियरबॉक्स और मोटर्स, न्यूमेटिक मोटर्स और कंट्रोल वाल्व, पोजीशन एनकोडर, क्लच सिस्टम, लुब्रिकेशन सिस्टम कंपोनेंट्स। • लैडल ट्रांसफर कार रेल ट्रैक सिस्टम (ए सीरीज़ टाइप) और गियरबॉक्स, स्टिरिंग कपलिंग। • लोमास गैस एनालाइज़र, मल्टी-लैब तापमान और सैंपल सिस्टम। • लैडल ट्रांसफर कारों के लिए स्टिरिंग कपलिंग। • पीएलसी और आरआइओ। • ऑटोमेशन सिस्टम और सॉफ्टवेयर। • हॉट ज़ोन हाइड्रोलिक पंप और वाल्व। • व्हील ब्लॉक के साथ हॉट ज़ोन गियर वाले मोटर्स। • कन्वर्टर बेयरिंग। • हवा और बिजली से चलने वाला स्लरी कॉम्पेक्शन पंप। • प्राइमरी आईडी फैन, बेयरिंग, मोटर्स, ड्राइव और लुब्रिकेशन सिस्टम। • डब्ल्यूडीएस-कोन
13.4	**इलेक्ट्रिक आर्क फर्नेस यूनिट** (प्राथमिक सामग्री जैसे स्क्रैप, डीआरआई, पिग आयरन और हॉट मेटल को विद्युत ऊर्जा का उपयोग	70%	• सहायक उपकरणों के साथ इलेक्ट्रोड रेगुलेशन प्रणाली • फर्नेस ट्रांसफार्मर सहित हाई करंट प्रणाली • सहायक उपकरणों के साथ ऑक्सीजन और कार्बन इंजेक्शन प्रणाली

	करके तरल इस्पात में परिवर्तित किया जाता है, जिससे कच्चे माल को पिघलाया और परिष्कृत किया जाता है)		• सहायक उपकरणों के साथ मैनुअल तापमान मापन और नमूनाकरण लांस
13.5	**लैडल फर्नेस यूनिट** [तरल इस्पात को वांछित ग्रेड प्राप्त करने के लिए संसाधित/शोधित किया जाता है और निरंतर कास्टिंग मशीन (सीसीएम) को आपूर्ति किए जाने से पहले बफर स्टॉक के रूप में रखा जाता है]	70%	• सहायक उपकरणों के साथ इलेक्ट्रोड विनियमन प्रणाली • सहायक उपकरणों के साथ मैनुअल तापमान मापन और नमूनाकरण लांस
13.6	**आरएच/आरएच-ओबी यूनिट** [आवश्यक विघटित गैस स्तर प्राप्त करने के लिए तरल इस्पात को डीगैस किया जाता है और फिर निरंतर कास्टिंग मशीन (सीसीएम) को आपूर्ति की जाती है]	65%	• सहायक उपकरणों के साथ गैस स्टिरिंग सिस्टम/लिफ्ट गैस स्टिरिंग सिस्टम वॉल्व स्टैंड • सहायक उपकरणों के साथ ऑक्सीजन लांस प्रणाली • सहायक उपकरणों के साथ हाइड्रिस मापन प्रणाली
13.7	**आर्गन/ऑक्सीजन डीकार्बराइजेशन (एओडी) इकाई**	70%	• एओडी कन्वर्टर को टिल्ट करने के लिए ड्राइव यूनिट, एयर मोटर, ब्रेक आदि। • लांस कॉपर टिप्स • पानी और ऑक्सीजन के लिए होज़ • इमरजेंसी टिल्टिंग ड्राइव के लिए न्यूमेटिक मोटर। • एओडी कन्वर्टर के लिए बेयरिंग, एयर मोटर के लिए इमरजेंसी गियर • सहायक उपकरणों के साथ ऑक्सीजन/आर्गन/नाइट्रोजन के लिए वाल्व स्टेशन। • रिफ्रैक्टरी मॉनिटरिंग (लेजर) मशीन • ऑटोमेशन सिस्टम।
13.8	**वीडी/वीओडी**	70%	• गैस एनालिसिस (ऑफ-गैस मास स्पेक्ट्रोमीटर) सिर्फ़ सेंसर। होल्डर भारत में बना है। • ऑटोमेशन और प्रोसेस कंट्रोल सॉफ्टवेयर प्लेटफॉर्म • सहायक उपकरणों के साथ वैक्यूम पंप सिस्टम • ऑक्सीजन टिप्स

			• सहायक उपकरणों के साथ ऑक्सीजन/ आर्गन/नाइट्रोजन के लिए वाल्व स्टेशन।
13.9	**सब्मर्ज्ड आर्क फर्नेस (एसएएफ) इकाई**	65%	• क्ले गन और ड्रिल मशीन • इलेक्ट्रोड उपकरण • स्लिपिंग डिवाइस असेंबली • इलेक्ट्रोड गाइडिंग असेंबली • ऊपरी और निचली मेंटल असेंबली • प्रेशर रिंग असेंबली • कॉन्टैक्ट शू असेंबली • हीट शील्ड असेंबली • इलेक्ट्रोड सील असेंबली • प्रेशर रिंग बेलोज़ • सील रिफ्रैक्टरी • फर्नेस ऑटोमेशन और कंट्रोलर सॉफ्टवेयर
13.10	**सतत कास्टिंग इकाई** (स्लैब कास्टर/बिलेट/ब्लूम राउंड/ कॉम्बी/बीम ब्लैंक) [तरल इस्पात को निरंतर कास्टिंग मशीन (सीसीएम) में स्लैब, बिलेट या ब्लूम में ढाला जाता है]	65%	• सहायक उपकरणों सहित लैडल स्लैग डिटेक्शन प्रणाली • कॉपर ट्यूब और प्लेट, मोल्ड ऑसीलेशन सिलेंडर। • रोटरी यूनियन। • सहायक उपकरणों सहित सतत तापमान माप प्रणाली। • सहायक उपकरणों के साथ टॉर्च कटिंग मशीन/ आपातकालीन टॉर्च कटर • सहायक उपकरणों सहित विद्युत ड्राइव सिस्टम सहित डी-ब्युरिंग मशीन • मार्किंग मशीन। • सहायक उपकरणों सहित रोल गैप चेकर • सहायक उपकरणों सहित इलेक्ट्रोमैग्नेटिक स्टिरर (ईएमएस)/इलेक्ट्रोमैग्नेटिक ब्रेकिंग (ईएमबीआर) प्रणाली
14	**फ्लैट उत्पाद मिल्स**		
14.1	**हॉट स्ट्रिप मिल्स/प्लेट मिल** (बाउंड्री लिमिट: सहायक उपकरणों सहित स्लैब यार्ड से डिस्पैच बे तक)	50%	• डी-स्केलर, मिल स्टैंड, बेड प्लेट, बैकअप रोल, वर्क रोल, मिल स्पिंडल, चॉक्स, एजीसी सिलेंडर, बेंडिंग ब्लॉक और सिलेंडर, शियर, डाउन कॉइलर, एंटी-फ्रिक्शन रोल नेक बेयरिंग, ऑयल फिल्म बेयरिंग, मिल

			रिड्यूसर, लोड सेल, थिकनेस गॉज, प्रोफाइल गॉज, लेवलर, रोल ग्राइंडिंग मशीन, कॉइल मार्किंग मशीन, प्लेट मार्किंग मशीन, मिल स्टैंड मोटर्स और मिल स्टैंड एमवी ड्राइव सिस्टम, ऑटोमेशन सिस्टम आदि।
14.2	**सीआरएम (पीएलटीसीएम)** (बाउंड्री लिमिट: पिकलिंग लाइन एंट्री से मिल एक्जिट तक)	50%	• वेल्डिंग मशीन, टैंशन लेवलर, मिल स्टैंड, बैकअप रोल, एंटीफ्रिक्शन बीयरिंग, ऑयल फिल्म बीयरिंग, रोल चॉक्स, रोल फोर्स सिलेंडर, रोल बेंडिंग और रोल शिफ्टिंग सिलेंडर, मिल स्पिंडल, लोड सेल, पोजिशन ट्रांसड्यूसर, इलेक्ट्रोस्टेटिक ऑइलर, साइड ट्रिमर, स्टीयरिंग सिस्टम, सरफेस इंस्पेक्शन सिस्टम, थिकनेस गेज, लेजर स्पीड गेज, टेंसियोमीटर, फ्लैटनेस गॉज, टैंशन रील, मिल रिड्यूसर, मिल स्टैंड मोटर्स और मिल स्टैंड एमवी ड्राइव सिस्टम, ऑटोमेशन सिस्टम आदि।
14.3	**सीआरएम (एचडीजीएल)** (बाउंड्री लिमिट: टेम्पर मिल और टैंशन लेवलर सहित एचडीजीएल में एंट्री से एक्जिट तक)	60%	• वेल्डिंग मशीन, रेडिएंट ट्यूब फर्नेस, जेट कूलिंग सिस्टम, इंडक्शन हीटिंग के साथ कोटिंग पॉट, पॉट रोल, एयर नाइफ वाइपिंग सिस्टम, टैंशन लेवलर, विड्थ गॉज, थिकनेस गेज, कोटिंग मोटाई गॉज, लोड सेल, रोल फोर्स सिलेंडर, मिल स्टैंड मोटर्स और मिल स्टैंड ड्राइव सिस्टम, ऑटोमेशन सिस्टम, आदि।
14.4	**सीआरएम (एसपीएम)** (बाउंड्री लिमिट: एसपीएम में एंट्री से एक्जिट तक)	50%	• मिल स्टैंड, बैकअप रोल, एंटीफ्रिक्शन बीयरिंग, ऑयल फिल्म बीयरिंग, रोल चॉक्स, रोल फोर्स सिलेंडर, मिल स्पिंडल, इलेक्ट्रोस्टेटिक ऑइलर, कॉइल मार्किंग सिस्टम, लोड सेल, थिकनेस गॉज, मिल स्टैंड मोटर्स और मिल स्टैंड एमवी ड्राइव सिस्टम, ऑटोमेशन सिस्टम, आदि।
14.5	**सीआरएम (बेल एनीलिंग फर्नेस)** (बाउंड्री लिमिट: फर्नेस बेस से पोस्ट कूलिंग उपस्कर तक)	55%	• फर्नेस, स्वचालन प्रणाली, आदि।
14.6	**सीआरएम (कलर कोटिंग लाइन)** (बाउंड्री लिमिट: सीसीएल में एंट्री से	80%	• कोटर, कोटिंग थिकनेस गेज, डिजिटल प्रिंटर, टैंशन लेवलर, स्वचालन आदि।

	एक्जिट तक)		
14.7	**टीएससीडीआर (थिन स्लैब कास्टिंग डायरेक्ट रोलिंग)** (बाउंड्री लिमिट: टूरेट से क्वाइल फिनिशिंग और पैकेजिंग एरिया)	50%	• सहायक उपकरणों सहित संपूर्ण लेडल स्लैग डिटेक्शन सिस्टम • कॉपर ट्यूब और प्लेट, मोल्ड ऑसिलेशन सिलेंडर। • रोटरी यूनियन। • सहायक उपकरणों सहित निरंतर तापमान मापने की प्रणाली। • पेंडुलम शीयर कटिंग मशीन। • सेगमेंट्स असेंबली • सहायक उपकरणों सहित रोल गैप चेकर कंप्लीट • सहायक उपकरणों सहित इलेक्ट्रोमैग्नेटिक स्टिरर (इएनएस)/इलेक्ट्रोमैग्नेटिक ब्रेकिंग (इएमबीआर) सिस्टम • टनल फर्नेस बर्नर • रफिंग और फिनिशिंग मिल स्टैंड, वर्क रोल और बैकअप रोल, एंटीफ्रिक्शन बेयरिंग, ऑयल फिल्म बेयरिंग, रोल चॉक्स, रोल फोर्स सिलेंडर, मिल स्पिंडल, मिल स्टैंड एमवी ड्राइव और मोटर, ऑटोमेशन सिस्टम, लैमिनार/पावर कूलिंग कंपोनेंट्स, हाइड्रोलिक क्वाइलर। प्रोफाइल गेज, थिकनेस गेज, विड्थ गेज। • नोजल • ग्रीस सिस्टम और सहायक उपकरण • हाइड्रोलिक सिस्टम और सहायक उपकरण • गियरबॉक्स • आरओटी रोल असेंबली • रोल असेंबली (स्लीव, शॉफ्ट, रोल) • लेडल टरेट और सहायक उपकरण (स्लीव बेयरिंग, डिस्क कपलिंग, गियरबॉक्स, हाइड्रोलिक क्लच और हाइड्रोलिक सिलेंडर) • मोल्ड ब्रेकआउट प्रिडिक्शन सिस्टम • ऑटो मोल्ड लेवल कंट्रोल न्यूक्लियोनिक गेज • मोल्ड पाउडर फीडिंग सिस्टम • सहायक उपकरणों सहित सीएनसी मोल्ड मशीनिंग सिस्टम • टंडिश और टरेट वजन प्रणाली

			• टनल फर्नेस रिफ्रैक्टरी रोल। • टनल फर्नेस शटल ड्राइव सिस्टम और गैस पहुंचाने की प्रणाली। • बैकअप रोल हाइड्रोस्टेटिक लुब्रिकेशन सिस्टम • रोल बाइट लुब्रिकेशन सिस्टम • सहायक उपकरणों सहित इन-फर्नेस कैमरा • क्रॉप शीयर • डेस्केलर सिस्टम और घटक। • कॉइल मार्किंग मशीन • ऑनलाइन कॉइल वजन प्रणाली • कट टू लेंथ स्टेकर सिस्टम • रोल शॉप (सीएनसी कॉम्बी ग्राइंडर, सीएनसी रोल ग्राइंडर, सीएनसी नाइफ ग्राइंडर, सीएनसी टर्निंग मशीन, लेथ मशीन) • क्वाइल स्ट्रैपिंग मशीन • डाउन कोइलर सिस्टम • मिल मापने की प्रणाली और सेंसर (ऑटोमैटिक गेज कंट्रोल (एजीसी) सेंसर (रोल फोर्स, गैप, दबाव) • अपने सेंसर सहित लूपर कंट्रोल सिस्टम • कंडीशन आधारित निगरानी प्रणाली और उसके सेंसर • क्वाइल शटल कार और पैलेट कन्वेइंग सिस्टम। • क्रेन कॉइल टोंग। • आरओ और यूएफ मेम्ब्रेन • सेल्फ-क्लीनिंग फिल्टर
14.8	**प्लेट मिल के लिए नॉर्मलाइज़िंग फैसिलिटी** (बाउंड्री लिमिट: नॉर्मलाइज़िंग फर्नेस में एंट्री से तैयार प्लेट्स के डिस्पैच तक)	50%	• फर्नेस बर्नर, फर्नेस हर्थ रोलर्स, लेवलर, लोड सेल, ऑटोमेशन
14.9	**एसएसएम (सिलिकॉन स्टील मिल)** (बाउंड्री लिमिट : पिकलिंग लाइन एंट्री से एसएसएम के डिस्पैच तक)	50%	• मिल स्टैंड, वर्क रोल और बैकअप रोल, एंटीफ्रिक्शन बीयरिंग, ऑयल फिल्म बीयरिंग, रोल चॉक्स, रोल फोर्स सिलेंडर, मिल स्पिंडल, मिल स्टैंड एमवी ड्राइव सिस्टम और मोटर्स, ऑटोमेशन सिस्टम, एनीलिंग फर्नेस, डीकार्बराइजिंग लाइन, इलेक्ट्रिकल स्टील परीक्षण इकाईयां (उदाहरण के लिए फिशर

			स्कोप मोटाई मापने वाला उपकरण, फ्रैंकलिन इंसुलेशन रेजिस्टिविटी टेस्टर, चुंबकीय कंसोल, स्टैकिंग फैक्टर टेस्टर)।
14.10	**सीआरएम (क्लस्टर मिल स्टैंड)** सेंडज़िमिर मिल (बाउंड्री लिमिट : सेंडज़िमिर मिल में एंट्री से एग्जिट तक)	50%	• सेंडज़िमिर मिल स्टैंड, वर्क रोल और बैकअप रोल, एंटीफ्रिक्शन बेयरिंग, ऑयल फिल्म बेयरिंग, रोल चॉक्स, रोल फोर्स सिलेंडर, मिल स्पिंडल, मिल स्टैंड एमवी ड्राइव सिस्टम और मोटर्स, ऑटोमेशन सिस्टम
14.11	**एचआरएम (स्टेकेल मिल)** (बाउंड्री लिमिट : कॉइलर फर्नेस एंट्री से स्टेकेल मिल तक और कॉइलर फर्नेस एग्जिट तक)	40%	• स्टेकेल मिल स्टैंड, हीटेड कॉइलर, वर्क रोल और बैकअप रोल, एंटीफ्रिक्शन बेयरिंग, ऑयल फिल्म बेयरिंग, रोल चॉक, रोल फोर्स सिलेंडर, मिल स्पिंडल, मिल स्टैंड एमवी ड्राइव सिस्टम और मोटर्स, ऑटोमेशन सिस्टम
15	**लॉग प्रोडक्ट मिल्स**		
15.1	**बार मिल/डब्ल्यू/एमएम/एलएसएम** (बाउंड्री लिमिट : फर्नेस एंट्री से डिस्पेच तक)	75%	• फास्ट फिनिशिंग ब्लॉक, रोल टर्निंग लेथ, प्रोफाइल गेज, ऑटोमेशन सिस्टम, आदि
15.2	**रेल मिल/हेवी स्ट्रकचरल मिल** (बाउंड्री लिमिट: मटीरियल हैंडलिंग को छोड़कर फर्नेस एंट्री से रेल वेल्डिंग संयंत्र एग्जिट तक)	45%	• मिल स्टैंड, मिल मोटर और ड्राइव सिस्टम, हीट ट्रीटमेंट इकाई, स्ट्रेटनिंग मशीन, • एनडीटी इकाईयां, वेल्डिंग मशीन, प्रोफाइल गेज, हॉट सॉ, कोल्ड सॉ, हॉट मार्किंग मशीन, रोल टर्निंग लेथ, सॉ ग्राइंडिंग मशीन, ऑटोमेशन सिस्टम, आदि।
15.3	ईआरडब्ल्यूपीपी (इलेक्ट्रिकल रेजिस्टेंस वेल्डेड पाइप संयंत्र) (बाउंड्री लिमिट: स्ट्रिप फीडिंग से फिनिशिंग इकाईयां और ईआरडब्ल्यूपीपी के डिस्पैच तक)	50%	• प्री-फॉर्मिंग यूनिट, ब्रेक-डाउन स्टैंड, एज बेंडर, यूनिवर्सल केज, फिनिशिंग पास (मल्टीपल स्टैंड), पाइप गाइड, हाई फ्रीक्वेंसी वेल्डिंग मशीन, हाई पावर इलेक्ट्रिक इंडक्टर, हाइड्रो टेस्टिंग, अल्ट्रासोनिक मशीन
15.4	एसडब्ल्यूपीपी (सर्पिल वेल्डेड पाइप संयंत्र) (बाउंड्री लिमिट: पाइप बनाने से फिनिशिंग इकाईयां और एसडब्ल्यूपीपी के डिस्पैच तक)	50%	• सबमर्ज्ड आर्क वेल्डिंग, आउटसाइड वेल्डिंग (स्केलप जॉइंट), एक्स- रे स्टेशन, हाइड्रो टेस्टिंग, बेवलिंग मशीन, अल्ट्रासोनिक मशीन, एंड रेडियोग्राफ स्टेशन

16	**व्हील संयंत्र**		
16.1	व्हील संयंत्र (राउंड/इनगॉट की रिसिप्ट से लेकर तैयार व्हील तक)	30%	• सर्कुलर सॉ, फोर्जिंग प्रेस, व्हील रोलिंग मिल, व्हील डिशिंग प्रेस, व्हील स्टैम्पिंग मशीन, रिम स्प्रेइंग मशीन, मोबाइल चार्जर, (हैंडलिंग रोबोट), मशीनिंग इकाईयां , टेस्टिंग इकाईयां, ऑटोमेशन सिस्टम आदि
16.2	रेलवे व्हील के लिए हीट ट्रीटमेंट इकाईयां (बाउंड्री लिमिट: हॉट डायमेंशन मेज़रमेंट से ब्लैक व्हील स्टोरेज तक का एग्जिट)	40%	• फर्नेस बर्नर, हर्थ रोलर्स, ऑटोमैटिक व्हील हैंडलिंग और क्वेंचिंग मशीन
16.3	व्हील और रेल के लिए नॉन डेस्ट्रक्टिव टेस्टिंग (एनडीटी) इकाईयां (बाउंड्री लिमिट: एनडीटी इकाईयां के एंट्री और एग्जिट)	30%	• हार्डनेस टेस्टिंग मशीन, अल्ट्रासोनिक टेस्टिंग मशीन, मैग्नेटिक पार्टिकल इंस्पेक्शन मशीन, एडी करंट टेस्टिंग मशीन
16.4	रोलिंग मिल स्टैंड के लिए फोर्ज्ड रोल विनिर्माण की इकाईयां (बाउंड्री लिमिट: फोर्ज्ड ब्लैंक रोल एंट्री से फिनिश्ड रोल के डिस्पैच तक)	30%	• फोर्जिंग प्रेस, मैनिपुलेटर्स, रोल हार्डनिंग मशीन, क्रायोजेनिक ट्रीटमेंट फैसिलिटी, टेम्परिंग फर्नेस, रोल ग्राइंडर, रोल टर्निंग लेथ, हार्डनेस टेस्टिंग मशीन, अल्ट्रासोनिक टेस्टिंग मशीन
16.5	आरजीबीएस/रोल शॉप	50%	• सीएनसी वर्क रोल ग्राइंडर/ सीएनसी कॉम्बी ग्राइंडर, सीएनसी रोल टर्निंग लेथ, • रोल के लिए इलेक्ट्रिक डिस्चार्ज टेक्सचरिंग (ईडीटी) और इलेक्ट्रिक डिस्चार्ज मशीनिंग (ईडीएम) की इकाईयां
17	रिफ्रेक्टरी ब्रिक (कच्चे माल की प्राप्ति से लेकर तैयार ब्रिक तक)	50%	• हाइड्रोलिक प्रेस
18	इल्केट्रिकल (विद्युत गुणवत्ता प्रणाली)	30%	• एमवीस्टेटकॉम • (स्टेटिक सिंक्रोनस कंपेंसेटर) प्रणाली
	अन्य सहायक और उपयोगिता वाले उपस्कर		
19	**कैल्सीनेशन संयंत्र** (कैल्साइन्ड लाइम और डोलो)		• फायरिंग सिस्टम, शाफ्ट लेवल इंडिकेटर, ऑटोमेशन सिस्टम • वीएफडीऔर सॉफ्ट स्टार्टर कार्ड। ड्राइविंग एयर ब्लोअर, डीड्रस्टिंग ड्राफ्ट फैन,

		कूलिंग एयर फैन, लाइम कूलिंग फैन, वेस्ट गैस फैन, गैस बूस्टर फैन असेंबली • हाइड्रॉलिक सिलेंडर, हाइड्रॉलिक मोटर्स, हाइड्रॉलिक स्टेशन।
20	**इलेक्ट्रिक मोटर चालित कोल्ड ब्लास्ट ब्लोअर** (एक्सियल/ एक्सियल लास्ट स्टेज रेडियल के साथ)	• एक्सियल / एक्सियल लास्ट स्टेज रेडियल ब्लोअर के साथ • ड्राइव सिस्टम के साथ मोटर • ब्लो - ऑफ वाल्व • ब्लोअर नॉन - रिटर्न वाल्व • नियंत्रण और इंस्ट्रूमेंटेशन आइटम
21	स्टीम टर्बाइन चालित कोल्ड ब्लास्ट ब्लोअर (एक्सियल/एक्सियल लास्ट स्टेज रेडियल के साथ)	• एक्सियल / एक्सियल लास्ट स्टेज रेडियल ब्लोअर के साथ • ब्लो - ऑफ वाल्व • ब्लोअर नॉन - रिटर्न वाल्व • कंट्रोल एंड इंस्ट्रूमेंटेशन आइटम
22	**डीजल इंजन चालित कोल्ड ब्लास्ट ब्लोअर** (एक्सियल/एक्सियल लास्ट स्टेज रेडियल रेडियल के साथ)	• एक्सियल/एक्सियल लास्ट स्टेज रेडियल ब्लोअर के साथ / रेडियल ब्लोअर और सिस्टम • डीजल इंजन • ब्लो-ऑफ वाल्व • ब्लोअर नॉन - रिटर्न वाल्व • कंट्रोल एंड इंस्ट्रूमेंटेशन आइटम
23	**गैस फायरड़/हीट रिकवरी बॉयलर**	• विशेष ग्रेड प्लेट्स और ट्यूब्स • फ्लेम स्कैनर • इंस्ट्रूमेंटेशन एंड कंट्रोल
24	**स्टीम टरबाइन** (एक्सट्रेशन/बीपीटीजी)	• स्पेशल ग्रेड ब्लेड सामग्री • गवर्निंग सिस्टम • टर्बो पर्यवेक्षी प्रणाली • इंस्ट्रूमेंटेशन एंड कंट्रोल
25	**गैस होल्डर**	• गैसहोल्डर सील, सीलेंट। • फिटिंग के साथ लेवल वेट रोप • वी.आर.वाल्व गैस्केट • डबल/ट्रिपल मेम्ब्रेन सिस्टम के लिए स्पेशल मेम्ब्रेन • हाईड्रोलिक
26	**हाई प्रेशर गैस बूस्टर** (आउटलेट प्रेशर > 2000 एमएम डब्ल्यूसी)	• गैस बूस्टर जिसमें कंट्रोल और बाईपास वाल्व शामिल हैं • पिस्टन रिंग्स • कंसेंट्रेट रिंग टाईप वाल्व (एसएस)

27	**प्रदूषण नियंत्रण प्रणालियाँ**	• टीआर सेट • कंट्रोलर्स • इंसुलेटरर्स • ईएसपी इलेक्ट्रिकल कंपोनेंट • कंट्रोल एंड इंस्ट्रूमेंटेशन आइटम
28	**जल एवं अपशिष्ट उपचार प्रणाली**	• मेंब्रेन • इवेपोरेटर (कंप्रेसर और टाइटेनियम शीट) • एचपी पंप्स • कंट्रोल एंड इंस्ट्रूमेंटेशन आइटम
29	**कंप्रेस्ड एयर स्टेशन**	• सेंट्रीफ्यूगल कंप्रेसर कोर असेंबली जिसमें इम्पेलर्स, बुल गियर, पिनियन शाफ्ट, बेयरिंग्स, वाइब्रेशन प्रोब्स और लोकल कंट्रोल पैनल शामिल हैं ।
30	**हाइड्रोजन संयंत्र**	• इलेक्ट्रोलाइज़र इकाई • एचपी कंप्रेसर • कंट्रोल एंड इंस्ट्रूमेंटेशन आइटम
31	**पैकेज्ड चिलर्स**	• कंप्रेसर • कंट्रोल एंड इंस्ट्रूमेंटेशन आइटम
32	**अन्य उपयोगिता वाले क्षेत्र जैसे-** एयर कंडीशनिंग और वेंटिलेशन सिस्टम, वीएएम बेस्ड चिलर सिस्टम, फायरफाइटिंग सिस्टम, गैस बूस्टर (डीपी 2000 एमएम डब्ल्यूसी से कम), कूलिंग वॉटर सिस्टम (पंपिंग स्टेशन, फिल्टर, कूलिंग टावर, हीट एक्सचेंजर, आदि), गैस मिक्सिंग स्टेशन, पॉल्यूशन कंट्रोल सिस्टम, इंटर प्लांट पाइपिंग सिस्टम	• आइटम/इक्विपमेंट में सब-कंपोनेंट/पार्ट्स होते हैं जो आयात किए जाते हैं • कंप्रेसर, चिलर, क्रेन एसी यूनिट, एक्पेनशन वाल्व, उपकरण, उच्च तापमान अनुप्रयोग वाले एसी।
33	**इलेक्ट्रिक ओवरहेड ट्रैवलिंग क्रेन और गैन्ट्री क्रेन, इलेक्ट्रिक होइस्ट**	• बैरल कपलिंग, हेवी ड्यूटी बेयरिंग, क्रेन रेल लुब्रिकेशन, स्लू रिंग बेयरिंग, टोंग्स
34	**इंजीनियरिंग शॉप**	• सीएनसी लेथ, सीएनसी मिलिंग मशीन
35	पावर जेनरेशन, ट्रांसमिशन और डिस्ट्रीब्यूशन सिस्टम; शॉप इलेक्ट्रिक्स जिसमें पावर और कंट्रोल सिस्टम और उससे जुड़े इलेक्ट्रिकल काम शामिल हैं	विद्युत मंत्रालय की मिनिमम लोकल कंटेंट (एमएससी)% गाइडलाइन के अनुसार

नोट : सभी उपस्कर की अधिप्राप्तिअनुपालन विद्युत मंत्रालय की दिशानिर्देशों के अंतर्गत/ क्लास-I श्रेणी के अनुसार किया जाएगा। ऐसे मामलों में जहाँ उपकरण क्लास-I श्रेणी में शामिल नहीं हैं, या जहाँ उपस्कर की श्रेणीकरण विशिष्टता विद्युत मंत्रालय की/दिशानिर्देशों में स्पष्ट रूप से परिभाषित नहीं है, वहाँ डीपीआईटीटी द्वारा जारी क्लास-I और क्लास-II श्रेणियों से संबंधित प्रावधानों का पालन किया जाएगा।

36	**इंस्ट्रूमेंटेशन आइटम/उपस्कर** **	डीपीआईटीटी के दिशानिर्देशों के अनुसार*	• अबोव/अंडर बर्डन जांच प्रणाली • प्रोफाइलोमीटर • बर्डन कैमरा • तुयेरे फिनोमिना डिटेक्शन प्रणाली (टीपीडीएस) • टॉप गैस एनालाइज़र (सीओ,सीओ$_2$,एच$_2$,ओ$_2$, पॉल्यूटेंट्स) • फ्लो जाम स्विच • एलिमेंटल एनालाईजर • मॉइस्चर एनालाईजर(न्यूक्लिओनिक) • सीवी एनालाईजर • थिकनेस गेज • हॉट मेटल डिटेक्टर • विड्थ गेज • फर्नेस कैमरा • मल्टीफेज प्रोफ़ाइल गेज • मल्टीफंक्शन/शेप गेज • सतह निरीक्षण प्रणाली • लेजर डॉप्लर वेलोसीटी मीटर • ऑप्टिकल बैरियर • हॉट रोलिंग के लिए थर्मल इमेजिंग सिस्टम • ऑटोमैटिक गेज कंट्रोल (एजीसी) सेंसर (रोल फोर्स, गैप, प्रेशर) • ऑनलाइन मैकेनिकल प्रॉपर्टी प्रेडिक्शन सिस्टम (एआई + सेंसर) • ऑयल फिल्म थिकनेस मॉनिटरिंग सिस्टम (कोल्ड रोलिंग) • एक्स-रे या न्यूक्लिओनिक आधारित कोटिंग थिकनेस गेज • मास फ्लो मीटर • हाइड्रिस (मोल्टन स्टील में हाइड्रोजन का पता लगाना) • मोल्ड लेवल मीजरमेंट • ब्रेक-आउट प्रीडीक्शन प्रणाली (बीओपीएस) • इल्क्ट्रोमैग्नेटिक ब्रेक (ईएमबीआर) नियंत्रण और सेंसर • लेडल ट्रैकिंग और प्रबंधन प्रणाली • स्लैग डिटेक्शन सिस्टम (एसडीएस)/ स्लैग मॉनिटरिंग सिस्टम • बीओएफ एंडपॉइंट डिटेक्शन (लेज़र-इंड्युस्ड

			ब्रेकडाउन स्पेक्ट्रोस्कोपी-एलआईबीएस) • सब-लांस सिस्टम (टेम्परेचर + O_2 + कार्बन + सैंपलिंग) • लैडल रिफ्रैक्टरी वियर मॉनिटरिंग (लेजर/ अल्ट्रासोनिक/इंफ्रारेड) • कंटीन्यूअस एमिशन मॉनिटरिंग सिस्टम (सीईएसएस- एसओx , एनओx, पीएस, सीओ, सीओ$_2$, ओ$_2$, एच2 के लिए इम्पोर्टेड एनालाइज़र) • बीओएफ/ ईएएफ (सीओ, सीओ$_2$, ओ$_2$, एच2 डस्ट) के लिए ऑफ - गैस एनालाइज़र • वॉटर क्वालिटी एनालाइज़र (पीएच, कंडक्टिविटी, ऑयल - इन - वॉटर, टीओसी, सिलिका, बीओडी, सीओडी, टीएसएस, टीडीएस, फिनोल, साइनाइड) • लेजर - आधारित गैस लीक डिटेक्टर (सीएज$_4$, सीओ, एच$_2$, एच2एस) • अक्सोटिक/ अल्ट्रासोनिक रिसाव का पता लगाना • वाइब्रेशन / कंडीशन मॉनिटरिंग सेंसर / एक्सियल शिफ्ट / डिफरेंशियल एक्सपेंशन मॉनिटरिंग सिस्टम • टक्कर रोधी प्रणाली (रडार/लेजर/लिडार) • ओवन पहचान प्रणाली (ओआईएस) • पाइरोमीटर • लोमास विश्लेषक • प्रेशर,टेम्परेचर और इलेक्ट्रोटेक्निकल पैरामीटर्स के लिए मास्टर कैलिब्रेटर • सिंटर संयंत्र में इरिच मिक्सर्स में स्थापित उपकरण और हैंज़ेल निर्मित लुब्रिकेशन प्रणालियाँ • टर्बाइन और टर्बो ब्लोअर के लिए गवर्नर सिस्टम • बाई-प्रोडक्ट संयंत्र के लिए टेल गैस एनालाइज़र • कोक बकेट लिफ्टर और रिवर्सिंग विंच में प्रयोग में आने वाले फोर्स सेंसर • एनकोडर, • हाइड्रोलिक वाल्व नियंत्रक • बीएलटी में स्थापित उपस्कर (दिल्ली स्विच,

			सोनिक सेंसर, एनकोडर,आदि) • फ्लेम सेंसर/स्कैनर
37	**ऑटोमेशन आइटम/उपस्कर ****	डीपीआईटीटी के दिशानिर्देशों के अनुसार *	
38	**वॉयस कम्युनिकेशन सिस्टम ****	डीपीआईटीटी के दिशानिर्देशों के अनुसार *	
39	**फायर डिटेक्शन और अलार्म (एफडीए) प्रणाली ****	डीपीआईटीटी के दिशानिर्देशों के अनुसार *	
40	**सीसीटीवी प्रणाली ****	डीपीआईटीटी के दिशानिर्देशों के अनुसार *	

नोट:

* इंस्ट्रूमेंटेशन, ऑटोमेशन संचार उपस्कर, फायर डिटेक्शन एंड अलार्म (एफडीए) प्रणाली और सीसीटीवी प्रणाली डीपीआईआईटी के साथ-साथ एमईआईटीवाई दिशानिर्देशों के अनुसार क्लास- I और क्लास- II आपूर्तिकर्ता मानदंडो के अनुरूप पूंजीगत वस्तुओं के लिए घरेलू सामग्री आवश्यकताओं का अनुपालन करेगी।

** अत्यधिक विशिष्ट उपस्कर, कंपोनेंट्स, और ज़रूरी पार्ट्स जैसे इंस्ट्रूमेंटेशन, ऑटोमेशन, कम्युनिकेशन सिस्टम, फायर डिटेक्शन और अलार्म (एफडीए) सिस्टम, और सीसीटीवी सिस्टम के लिए सेमीकंडक्टर चिप्स अभी वैश्विक प्रौद्योगिकी वाली अग्रणी कंपनियों से लिए जा रहे हैं। हालांकि, पूरे सिस्टम असेंबली, इंटीग्रेशन, और मैन्युफैक्चरिंग का कार्य भारत में ही किया जा रहा है, और शेष कंपोनेंट्स स्वदेसी स्रोतो से अधिप्राप्त किये जा रहे हैं।

परिशिष्ट-ग

लौह एवं इस्पात क्षेत्र में स्वदेशी प्रौद्योगिकियों को बढ़ावा देना

1) **उद्देश्य:**

इस्पात विनिर्माण के सभी चरणों में स्वदेशी प्रौद्योगिकियों का अंगीकरण, विकास और विस्तार को प्रोत्साहित करके भारतीय लौह एवं इस्पात क्षेत्र में आत्मनिर्भरता को बढ़ावा देना।

2) **विषय क्षेत्र:**

यह नीति इस्पात बनाने या इस्पात विनिर्माण संयंत्र स्थापित करने वाले केन्द्रीय सार्वजनिक क्षेत्र के उद्यमों पर लागू होती है।

3) **नीति निदेश:**

3.1 ऐसे मामले जहां प्रौद्योगिकी और पूर्व इंजीनियरिंग एवं आपूर्ति के लिए प्रमाण उपलब्ध हैं, लेकिन वर्तमान क्षमता आवश्यकता से मेल नहीं खाते हैं, ऐसे मामलों में स्वदेशी प्रौद्योगिकी प्रदाताओं के लिए निम्नलिखित शर्तें लागू होंगी:

3.1.1 उत्पादन क्षमता प्रस्तावित संयंत्र की क्षमता का 30% होगी

3.1.2 वेंड़र्स के साथ स्पष्ट साझेदारी की प्रामाणिक उपलब्धता

3.1.3 प्रस्तावित संयंत्र की क्षमता के कम से कम 75% के लिए परियोजनाओं की डिटेल इंजीनियरिंग कार्यों का अनुभव

3.2 ऐसे मामले जहां प्रौद्योगिकी उपलब्ध है, लेकिन अर्लियर सप्लाई के लिए कोई संदर्भ उपलब्ध नहीं है, ऐसे मामलों में स्वदेशी प्रौद्योगिकी प्रदाताओं के लिए निम्नलिखित शर्तें लागू होंगी:

3.2.1 स्वदेशी प्रौद्योगिकी आपूर्तिकर्ता ने प्रस्तावित परियोजना की कम से कम 75% विशेषताओं से मेल खाते हुए परियोजनाओं की डिटेल इंजीनियरिंग कार्य किया हो

3.2.2 स्वदेशी प्रौद्योगिकी आपूर्तिकर्ता ने प्रस्तावित परियोजना की महत्वपूर्ण विशेषताओं से 100% मेल खाते हुए डिटेल इंजीनियरिंग कार्य किया हो

3.2.3 वेंड़र्स के साथ स्पष्ट गठजोड़ की उपलब्धता

3.2.4 प्रौद्योगिकी उपलब्धता के प्रमाणिक साक्ष्य (आईपीआर या अन्य पर्याप्त साक्ष्य)

3.3 ऐसे मामलों में जहाँ कोई भारतीय प्रौद्योगिकी उपलब्ध नहीं है, वहाँ यदि कोई विदेशी प्रौद्योगिकी प्रदाता तीन वर्षों के भीतर भारतीय सीपीएसई (जिसमें अधिप्राप्ति करने वाली इकाई भी शामिल है) को प्रशिक्षण और सहयोग सहित प्रौद्योगिकी हस्तांतरण करने का वचन देता है, तो उसे घरेलू मूल्य संवर्धन के प्रतिशत पर ध्यान दिए बिना माना हुआ श्रेणी-1 आपूर्तिकर्ता (डीम्ड क्लास-1 सप्लायर) माना जाएगा। इस स्थिति में, क्रय वरीयता उस विदेशी प्रौद्योगिकी प्रदाता को दी जाएगी, जैसा कि डीपीआईआईटी के सार्वजनिक अधिप्राप्ति (मेक इन इंडिया को प्राथमिकता) आदेश में समय-समय पर संशोधित किया गया है।

4) **कार्यान्वयन निरीक्षण:**

इस्पात मंत्रालय द्वारा गठित स्थायी समिति कार्यान्वयन की निगरानी करेगी, विवादों का समाधान करेगी तथा पात्रता एवं प्रोत्साहन मानदंडों को समय-समय पर अद्यतन करेगी।

प्रपत्र-1

मेल्ट एंड पोर आवश्यकताओं (परिशिष्ट- क*) और/या घरेलू मूल्य वर्धन आवश्यकताओं (परिशिष्ट-क और परिशिष्ट-ख*) के अनुपालन के लिए स्व-प्रमाणन का हलफनामा

*परिशिष्ट-ख पूंजीगत वस्तुओं के लिए, नीति के तहत अनिवार्य रूप से वैधानिक लेखापरीक्षक/लागत लेखापरीक्षक/सीए प्रमाणपत्र के साथ यह शपथपत्र अवश्य संलग्न होना चाहिए।

मैं,_____,निवास_____,मेसर्स_____

_के अधिकृत हस्ताक्षरकर्ता होने के नाते _____ एतद्द्वारा पूर्णतया प्रतिज्ञा और घोषणा करता/करती हूँ;

1. मैंने दिनांक_____ को जारी अधिसूचना संख्या_____ घरेलू स्तर पर विनिर्मित लौह एवं इस्पात उत्पाद (डीएमआई एवं एसपी) नीति, 2025, को पढ़ और समझ लिया है। मैं उक्त नीति और उस निविदा की सभी शर्तों और नियमों का पालन करने के लिए सहमत हूं जिसके संबंध में यह शपथपत्र प्रस्तुत किया गया है।

2. यह शपथपत्र निम्नलिखित लौह एवं इस्पात उत्पाद/पूंजीगत वस्तुओं से संबंधित है:

उत्पाद का नाम: _____

एचएस कोड: _____

परिशिष्ट वर्गीकरण: परिशिष्ट-क/परिशिष्ट-ख (जैसा लागू हो, चुनें)

प्रापण एजेंसी: _____

3. मेल्ट एंड पोर - यह केवल परिशिष्ट-क में उल्लिखित उन वस्तुओं पर लागू होता है जिनमें मेल्ट एंड पोर संबंधी शर्त होती है।

मैं एतद्द्वारा घोषणा करता/करती हूँ कि उपरोक्त उत्पाद भारत में मेल्ट एंड पोर की आवश्यकताओं जैसा कि विशेष रूप से परिशिष्ट- क में अधिसूचित किया है, को पूरा करते हैं। विशेष रूप से:

भारत में ही इस्पात को मेल्ट और पोर किया गया था।

पहला सॉलिड शेप (स्लैब/बिलेट/इनगॉट/अन्य) निम्नलिखित स्थान(स्थानों) पर उत्पादित किया गया था:

इस्पात निर्माण इकाई: _____स्थान: _____ हीट रिकॉर्ड; _____ बैच विवरण: _____

मैं प्रापण एजेंसी द्वारा आवश्यकता पड़ने पर इस घोषणा को प्रमाणित करने के लिए मिल परीक्षण प्रमाण पत्र, हीट रिकॉर्ड और कोई अन्य दस्तावेजी प्रमाण प्रस्तुत करने का वचन देता हूं।

(यदि लागू न हो, तो "लागू नहीं" लिखें।)

4. घरेलू मूल्य संवर्धन - परिशिष्ट-क डीवीए मदों और परिशिष्ट-ख पूंजीगत वस्तुओं पर लागू:

मैं एतद्द्वारा घोषणा करता/करती हूँ कि उत्पाद(उत्पादों) का घरेलू मूल्यवर्धन (डीवीए)% _____ है। डीवीए की गणना डीपीआईआईटी दिशानिर्देशों और डीएमआईएंडएसपी नीति, 2025 में निर्दिष्ट फार्मुला के अनुसार की गई है।

4क. परिशिष्ट- ख पूंजीगत वस्तुओं (अनिवार्य) के लिए: वैधानिक लेखापरीक्षक/लागत लेखा परीक्षक/चार्टर्ड लेखाकार द्वारा जारी प्रमाण पत्र संलग्न है, जो नीति के अनुसार पूंजीगत वस्तु पैकेज के डीवीए की पुष्टि करता है।

(यदि यह केवल परिशिष्ट-क का आइटम है, तो इस खंड को रद्द कर दें।)

5. मैं पुष्टि करता/करती हूँ कि: दी गई सभी जानकारी सत्य और सही है। सभी इनपुट स्टील की लागत, आयातित सामग्री और घरेलू सामग्री की गणना सत्यापित की जा चुकी है। सभी उत्पादन, खरीद और मूल्य निर्धारण संबंधी रिकॉर्ड जांच के लिए उपलब्ध हैं।

यदि कोई भी जानकारी गलत या भ्रामक पाई जाती है: प्रापण एजेंसी अपने मानदंडों के अनुसार मुझे/मेरी फर्म को सरकारी निविदाओं से अयोग्य घोषित कर सकती है। मैं नीति और निविदा शर्तों के अनुसार, ईएमडी की जब्ती सहित सभी मूल्यांकन लागतों और जुर्माने का भुगतान करने के लिए सहमत हूं।

6. मैं संबंधित रिकॉर्ड को बनाए रखने और उन्हें किसी भी वैधानिक प्राधिकारी को उपलब्ध कराने का वचन देता हूं।

7. घोषणा: मैं एतद्द्वारा घोषणा करता/करती हूँ कि ऊपर दिए गए कथन मेरी जानकारी और विश्वास के अनुसार सत्य है। मैं समझता/समझती हूँ कि किसी भी प्रकार की गलत जानकारी देने पर डीएमआईएंडएसपी नीति, लागू कानूनों और निविदा शर्तों के तहत दंड का प्रावधान होगा।

(स्थान एवं दिनांक)

मैसर्स_____

के लिए और उनकी ओर से

(अधिकृत हस्ताक्षरकर्ता)

[फा. सं. 8(2)/2023-आईडी-I]

अभिजीत नरेंद्र, संयुक्त सचिव

MINISTRY OF STEEL

NOTIFICATION

New Delhi, the 17th December, 2025

G.S.R. 904(E).— In supersession of earlier Domestically Manufactured Iron & Steel Products Policy, the revised Domestically Manufactured Iron & Steel Products Policy-2025 for providing preference to Domestically Manufactured Iron & Steel Products in Government procurement is hereby published for general information.

POLICY FOR PROVIDING PREFERENCE TO DOMESTICALLY MANUFACTURED IRON & STEEL PRODUCTS IN GOVERNMENT PROCUREMENT- REVISED, 2025

1. **Background**

1.1. This policy provides preference for Domestically Manufactured Iron and Steel Products (DMI&SP) in Government procurement.

1.2. The policy applies to procurement of iron & steel products notified in Appendix A, procurement of capital goods listed in Appendix B and technology from indigenous technology suppliers in Appendix C.

2. **Definitions**

2.1. **Bidder** may be a domestic/foreign manufacturer of iron & steel or their selling agents/ authorized distributors/authorized dealers/ authorized supply house or any other company engaged in the bidding of projects funded by Government agencies.

2.2. **Domestically Manufactured Iron & Steel Products** are those iron and steel products that are manufactured by entities that are registered and established in India, including in Special Economic Zones (SEZs).

2.3. **Domestic Manufacturer** is a manufacturer conforming to Section 2(72) of the Central Goods and Services Tax (CGST) Act, 2017.

2.4. **Domestic value addition** means the amount of value added in India which shall be the total value of the item to be procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value of the item to be procured, in percent. The 'domestic value addition' definition shall be in line with the DPIIT guidelines and shall be suitably amended in case of any changes by DPIIT in the future. For the purpose of this policy document, domestic value addition and local content have been used interchangeably.

% Domestic value addition =

{Total value of the item to be procured (excluding net domestic indirect taxes) – The value of

imported content in the item (including all customs duties)}

---------- X 100%

{Total value of the item to be procured}

2.5. **Finished Steel** means flat and long products, which can be subsequently processed into manufactured items.

2.6. **Government** for the purpose of the Policy means Government of India.

2.7. **Government agencies** include Government PSUs, Societies, Trusts, and Statutory bodies set up by the Government of India.

2.8. **Indigenous Technology:** A technology shall be deemed to be Indigenous technology if, at least 51 % of the entity's equity is held by Indian residents and the IPR is owned or co-owned by an Indian entity or licensed exclusively to them and the core engineering R&D, and project execution capabilities reside in India.

2.9. **L1** means the lowest tender, or the lowest bid or the lowest quotation received in a tender, bidding process, or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

2.10. **MoS** means Ministry of Steel, Government of India.

2.11. **Margin of purchase preference** means the maximum extent to which the price quoted by a domestic supplier may be above L1 for the purpose of purchase preference. In the case of DMI&SP policy, the margin of purchase preference shall be 20% for items in Appendix B.

2.12. **Melt & Pour** is defined as the steel that has been produced in a steel-making furnace and poured into its first solid shape. The location where this process takes place is called the country of melt and pour (COM). The COM is the original location where crude steel is first produced in a liquid state and poured into its first solid shape. The country of melt and pour (COM) should be India. The first solid shape can be a semi-finished product, like a slab, billet, ingot, or a finished steel mill product.

2.13. **Net Selling Price** means the invoiced price excluding net domestic taxes and duties.

2.14. **Semi-Finished Steel** means Ingots, billets, blooms, and slabs, which can be subsequently processed into finished steel.

3. **Exclusions**

3.1. Waivers may be granted by the Ministry of Steel to all such Government procurements subject to the below conditions:

3.1.1. Where specific grades of steel are not manufactured in the country, or

3.1.2. Where the quantities as per the demand of the project cannot be met through domestic sources.

3.2. Exemption requests shall be submitted to the Standing Committee along with sufficient proof of unavailability of iron & steel products domestically.

4. **Standing Committee**

4.1. A Standing Committee chaired by the Secretary (Steel), shall oversee the implementation of the policy.

4.2. The Committee shall comprise of experts drawn from Industry/Industry Association/Government Institution or Body/Ministry of Steel. The said Committee in MoS shall have the mandate for the following:

4.2.1. Monitor the implementation of the policy.

4.2.2. Review and notify the list of Iron & Steel products, the domestic content requirement criteria and policy directives as mentioned in Appendix A, Appendix B and Appendix C.

4.2.3. Issue necessary clarifications for implementation of the policy including grant of exclusions to procuring agencies.

4.2.4. Constitute a grievance redressal committee for preliminary examination of complaints related to implementation of this policy.

4.2.5. Issue directions for suitable action to Ministries/Departments concerned in case of non-compliance with this policy by the procuring agency and advise.

4.3. Wherever a procuring entity concludes that an unreasonably high price has been quoted by the sole bidder/manufacturer, the matter may be referred to the Committee. In such cases, the procuring entity would be required to substantiate its case with complete and thorough documentation.

4.4. Specifying foreign certifications/unreasonable technical specifications in bid document is a restrictive and discriminatory practice against local suppliers. If foreign certification is required to be stipulated because of non-availability of Indian Standards and/or for any other reason, the same shall be done only after written approval of the Committee.

5. **Applicability**

5.1. The policy applies to every Ministry or Department of Government and all agencies/entities under their administrative control and to projects funded by these agencies for the purchase of iron & steel products for government projects. All Central Sector Schemes (CS)/Centrally Sponsored Schemes (CSS) for which procurement is made by States and Local Bodies, come within the purview of this Policy if that project/scheme is fully/partly funded by the Government of India.

5.2. The policy applies to public sector steel manufacturers and agencies/entities under their administrative control for purchase of capital goods (Appendix-B) for manufacturing iron & steel products.

5.3. Appendix-B contains the list of capital goods used in manufacturing iron & steel products which can be imported, and the applicable minimum domestic content requirement for packages.

5.4. A purchase preference of 20% is applicable for capital goods used in steel manufacturing. For example, if the lowest bidder (L1) for an importable capital good is a foreign company with a quoted price of Rs.100 crore for the product package, under the policy, procurement preference of 20% will be applicable to a domestic supplier of the same capital good.

5.5. Appendix-C contains directives and methodology for steelmaking CPSEs to procure from indigenous technology suppliers.

5.6. The policy shall apply to projects and non-projects where the total procurement value of iron and steel products (Appendix-A) in a contract is greater than Rs. 5 lakhs, on itemized basis.

5.7. No Global Tender Enquiry (GTE) shall be invited for tenders related to the procurement of iron and steel products (Appendix-A of the DMI&SP Policy). No Global Tender Enquiry (GTE) shall be invited for tenders related to the procurement of Capital Goods for manufacturing iron & steel products (Appendix-B of the DMI&SP Policy) having estimated value up to Rs. 200 crore except with the approval of competent authority as designated by Department of Expenditure.

5.8. The policy applies to the purchase of iron & steel products by private agencies for fulfilling an EPC contract and/or any other requirement of a Ministry or Department of Government or their PSUs.

6. **Tender procedure for procurement**

6.1. Procuring agencies shall follow standard government procurement procedures while adhering to the DMI&SP policy.

6.2. The tender document, for procurement of both Goods as well as for EPC contracts, should explicitly outline the qualification criteria for adherence to the requirement as mentioned in Appendix A and Appendix B.

6.3. All bidders – including manufacturers, selling agents, authorized distributors, authorized dealers, and authorized supply houses – shall submit Form-1 as part of their bid, irrespective of whether they are the manufacturer or otherwise.

6.4. Bidders who are selling agents/authorized distributors/authorized dealers/authorized supply houses of the domestic manufacturers of iron & steel products, covered by Appendix-A, are eligible to bid with self-certification on behalf of the domestic manufacturers under the policy, subject to the bidder furnishing an authorization certificate issued by the domestic manufacturer at the time of delivery.

6.5. For products covered under Appendix B of the DMI&SP policy, the bidder shall furnish certification issued by the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) declaring that the capital goods to be used in iron & steel industry are domestically manufactured in terms of the domestic value addition prescribed.

6.6. If Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, due to restrictive tender conditions which have direct or indirect effect of barring Indian companies such as registration in the procuring country, execution of projects of specific value in the procuring country etc., it shall provide such details to the procuring entities for appropriate reciprocal action.

6.7. Entities of countries that have been identified by the Ministry of Steel as not allowing Indian companies to participate in their Government procurement for any item related to the Ministry of Steel shall not be allowed to participate in Government procurement in India for all items related to Ministry of Steel, except for the list of items published by Ministry of Steel permitting their participation.

6.8. The stipulation above shall be part of all tenders including those on GeM portal invited by the Central Government procuring entities.

6.9. In case restrictive or discriminatory conditions against domestic suppliers are included in bid documents, an inquiry shall be conducted by the Administrative Department undertaking the procurement (including procurement by any entity under its administrative control) to fix responsibility for the same. Thereafter, appropriate action, administrative or otherwise, shall be taken against erring officials of procurement entities under relevant provisions. Intimation on all such action shall be sent to the Standing Committee under the DMI&SP policy.

6.10. A supplier debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities.

6.11. In case, the matter is referred to the Ministry of Steel, the grievance redressal committee set up under the MoS shall dispose of the complaint within 4 weeks of its reference and receipt of all documents from the bidder after taking into consideration, the view of the Government Agency. The bidder shall be required to furnish the necessary documentation in support of domestic value addition claimed in iron & steel products to the grievance redressal committee under MoS within 2 weeks of the reference of the matter.

6.12. Procuring agency shall define the penalties, in case of a wrong declaration by the bidder of the prescribed domestic value addition, in the tender document. The penalties may include forfeiting of the EMD, other financial penalties, and blacklisting of such manufacturer/service provider etc., in terms of extant rules.

7. **Implementation monitoring by the Ministry of Steel**

7.1. The policy provisions shall be applicable for 5 years from the date of publication and may further be extended at the discretion of the Ministry of Steel.

7.2. MoS shall be the nodal ministry to monitor the implementation of the policy.

7.3. Agencies covered under DMI&SP policy shall send declaration on a quarterly basis indicating the extent of compliance to the policy and reasons for non-compliance thereof, during the preceding financial year.

Appendix-A

List of iron and steel products which can only be procured from domestic sources

Sl. No	Iron & Steel Products	HS Code	Condition
1	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot rolled, not clad, plated or coated	7208	Melt & Pour
2	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, cold rolled (cold-reduced), not clad, plated or coated	7209	Melt & Pour
3	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated	7210	Melt & Pour
4	Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, not clad, plated or coated	7211	Melt & Pour
5	Flat-rolled products of iron or non-alloy steel, of a width of less than 600 mm, clad, plated or coated	7212	Melt & Pour
6	Bars and rods, hot-rolled, in irregularly wound coils, of iron or non-alloy steel	7213	Melt & Pour
7	Other bars and rods of iron or non-alloy steel, not further worked than forged, hot rolled, hot-drawn or hot-extruded, but including those twisted after rolling	7214	Melt & Pour
8	Other bars and rods of iron or non-alloy steel	7215	Melt & Pour
9	Angles, shapes and sections of iron or non-alloy steel	7216	Melt & Pour
10	Wire of iron or non-alloy steel	7217	Melt & Pour
11	Flat-rolled products of stainless steel, of a width of 600 mm or more	7219	Melt & Pour
12	Flat-rolled products of stainless steel, of a width of less than 600 mm	7220	Melt & Pour
13	Other bars and rods of stainless steel; angles, shapes and sections of stainless steel	7222	Melt & Pour
14	Wire of other alloy steel	7229	Melt & Pour

15	Rails, railway or tramway track construction material of iron or steel	7302	50% Domestic Value Addition
16	Tubes, pipes and hollow profiles, of cast iron	7303	50% Domestic Value Addition
17	Tubes, pipes and hollow profiles, seamless, of iron (other than cast iron) or steel	7304	50% Domestic Value Addition
18	Other tubes and pipes (for example, welded, riveted or similarly closed), having circular cross-sections, the external diameter of which exceeds 406.4 mm, of iron or steel	7305	50% Domestic Value Addition
19	Other tubes, pipes and hollow profiles (for example, open seam or welded, riveted or similarly closed), of iron or steel	7306	50% Domestic Value Addition
20	Tube or pipe fittings (for example, connectors/couplings, elbow sleeves), of iron or steel	7307	50% Domestic Value Addition
21	Bars and rods, hot-rolled, in irregularly wound coils, of stainless steel	7221	Melt & Pour
22	Wire of stainless steel	7223	Melt & Pour
23	Flat-rolled products of other alloy steel, of a width of 600 mm or more, including electrical steel	7225	Melt & Pour
24	Flat-rolled products of other alloy steel, of a width of less than 600 mm, including electrical steel	7226	Melt & Pour
25	Bars and rods, hot-rolled, in irregularly wound coils, of other alloy steel	7227	Melt & Pour
26	Other bars and rods of other alloy steel; angles, shapes and sections, of other alloy steel; hollow drill bars and rods, of alloy or non-alloy steel	7228	Melt & Pour
27	Sheet piling of iron or steel, whether or not drilled, punched or made from assembled elements; welded angles, shapes and sections, of iron or steel	7301	50% Domestic Value Addition
28	Structures (excluding prefabricated buildings of heading 9406) and parts of structures	7308	50% Domestic Value Addition
29	Reservoirs, tanks, vats and similar containers for any material (other than compressed or liquefied gas), of iron or steel, of a capacity exceeding 300 whether or not lined or heat insulated, but not fitted with mechanical or Thermal equipment	7309	50% Domestic Value Addition
30	Tanks, casks, drums, cans, boxes and similar containers, for any material(other than compressed or liquefied gas), of iron or steel, of a capacity not exceeding 300L,whether or not lined or heat-insulated, but not fitted with mechanical or thermal equipment	7310	50% Domestic Value Addition
31	Containers for compressed or liquefied gas, of iron or steel	7311	50% Domestic Value Addition
32	Stranded wire, ropes, cables, plaited bands, slings and the like, of iron or steel, not electrically insulated	7312	50% Domestic Value Addition
33	Barbed wire of iron or steel; twisted hoop or single flat wire, barbed or not, and loosely twisted double wire, of a kind used for fencing, of iron or steel	7313	50% Domestic Value Addition
34	Grill, netting and fencing, of iron or steel wire; expanded metal of iron or steel	7314	50% Domestic Value Addition
35	Chain and parts thereof, of iron or steel	7315	50% Domestic Value Addition

36	Anchors, grapnels and parts thereof, of iron or steel	7316	50% Domestic Value Addition
37	Articles of iron and steel	7317	50% Domestic Value Addition
38	Articles of iron and steel	7318	50% Domestic Value Addition
39	Articles of iron and steel	7319	50% Domestic Value Addition
40	Springs and leaves for springs, of iron or steel	7320	50% Domestic Value Addition
41	Stoves,ranges,grates,cookers(including those with subsidiary boilers for central heating), barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel	7321	50% Domestic Value Addition
42	Radiators for central heating, not electrically heated, and parts thereof, of iron or steel; air heaters and hot air distributors, not electrically heated, incorporating a motor-driven fan or blower, and parts thereof, of iron or steel	7322	50% Domestic Value Addition
43	Tables and similar house hold articles and parts thereof, of iron or steel	7323	50% Domestic Value Addition
44	Sanitary ware and parts thereof, of iron or steel	7324	50% Domestic Value Addition
45	Other cast articles of iron or steel	7325	50% Domestic Value Addition
46	Electrical steel and other articles of iron or steel	7326	50% Domestic Value Addition
47	Railway or tramway passenger coaches, not self-propelled	8605	50% Domestic Value Addition
48	Railway or tramway goods vans and wagons, not self-propelled	8606	50% Domestic Value Addition
49	Parts of railway or tramway locomotives or rolling-stock; such as bogies, bissel-bogies, axles and forged wheels, and parts thereof	8607	50% Domestic Value Addition

Appendix- B

List of Capital Goods (non-exhaustive) which can be imported for Manufacturing Iron & Steel products, and minimum domestic content applicable for the package

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
	Mining		
1	**Equipment for Mining development** • Crushing & Screening Plant • Mineral beneficiation (iron ore and coal) plant; (Boundary Limit: from Receiving of ROM at the crusher hopper, comminution, segregation, ore/coal processing up to final product preparation) • Slime Beneficiation • Automatic Loading facilities • Conveyer system	75%	• Wet High Intensity Magnetic Separator / High Gradient Magnetic Separator • Heavy Media Cyclone • Gyratory Crusher • Spiral Concentrator • Online Ash Analyzer • Ball/Rod/AG Mill (Greater than 3.5 m dia)
2	**Mining transportation** • Slurry Pipelines • Long distance conveying system	30%	• PD Pump • Valves • Specialized/rope/pipe conveyor
3	**Other Mining Machinery & Heavy Earth Moving equipment for mines** (Boundary Limit: Equipment for drilling, raising, lading, haulage, and mine preparation)	Not Applicable	• Dumper (above 220 tons pay load capacity), Hydraulic Excavators (above 9 Cubic meter bucket capacity) • Blast Hole Drills 10"(Electric/Diesel) • Diesel driven Track Dozer >850 HP Capacity • Diesel Driven Wheel Dozer >500 HP capacity • Diesel driven Front End Wheel Loader >8 Cubic Meter bucket Capacity
4	**Pellet Plant Equipment** (Boundary Limit – Receiving Ground Hopper for flux & Binder, Belt Conveyor feeding IOF to product pellet belt conveyor)	85%	• Pellet car, High Intensive Mixer, Balling Discs, Vertical roller mill, Drive/discharge end Sprocket assembly, curved rail, Slide rails, Single deck roller screen and Double deck roller screen, Induration Machine Drive assembly, Level-2 automation
	Iron/steel making		
5	**Raw Material Handling System** (Boundary Limit – from Wagon Tippler to respective user units)	95%	• Barrel Couplings, Heavy Duty Bearings, Crane Rail Lubrication System, Slew Ring Bearings, Tongs (Special), Vibration Isolation System (Spring Damper), Hydraulic motor & hydraulic pump (installed in wagon tippler, side arm charger, stacker cum reclaimer, slew stacker), electronic cards, unbalanced motor, cam limit switch of wagon tippler.
6	**Coke Oven Battery** (Both top charged & stamp charged) (From Coal bunker to coke discharge bucket)	90%	• Springs of the anchorage systems, COG booster, stamping train, bonding press

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
7	**Coke Dry Quenching Plant** (From Hot coke receiving bucket to discharge chute of cooling chamber)	90%	• Mill fan & Motor, Special Refractory for Twin Flue of Cooling Chamber.
8	**By-Product Plant** (From Primary Gas cooler to clean coke oven gas up to the network)	90%	• Exhauster & Motor, burner of the clause kiln, Catalyst, Tail gas analyzer, Palletization unit.
9	**Sinter Plant Equipment** (Boundary Limit – Receiving Bin for Raw Material to Vibro-Feeder below Product Sinter Bin)	75%	• Highly Intensive Mixer & Granulator Unit, Pallet cars, Drive Sprocket, Main Drive with Gear Box of sinter machine, slide rail & curved rail, Hot Sinter breaker and Grizzly, Annular Dip Rail Cooler, LCI Drive system for Sinter Plant Exhauster application. • Ignition Furnace Spare parts (Refractory/Control System/Burner Assembly) • Exhauster (Waste Gas Fan) and System Spare Parts
10	**Blast Furnace Equipment** Boundary Limit: **Input** • **Raw material-** Top of bunkers of respective material • **Cold Blast**- Inlet of the snort valve • **Industrial water**- BF pump house **Output** • **Hot Metal**- Filled in the torpedo ladle • **Granulated Slag** - to the granulated slag yard	70%	• Bell less top gear box, upper seal device covering upper material gate and upper seal valve, lower seal device covering lower material gate and lower seal valve, Bleeder valve, Tilting Rocker, Wear liners, Goggle Valve, Equalizing & Relief Valve, Chute Rotation Motors, Distribution chute, Feeder spout, Chutes & Funnels etc. • Hearth Refractory (carbon blocks) • Top Recovery Turbine system (TRT) • Cu-staves • SGI Staves • Cast house equipment (Mud gun, Drilling machine and main trough Manipulator) • Probes, Profilometer & Stock level indicator (radar type) • Gas cleaning plant (AGS system) • Stove system – ceramic burner & technological valve • Waste Heat Recovery system • Turbo blowers • Ball Mill • PCI Injection System • Level-II automation • Copper plate coolers • Tuyere cooler • Stove technological valves • Dewatering Wheel of SGP • Torpedo Ladle Car chain assembly • Dome filled dump Valves • Tuyere stock assembly
11	**Gas based Direct Reduction Plant Equipment** (Boundary Limit: Receipt of raw	50%	• Reactor charging system • Reactor • Reactor discharging system

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
	material at the top of the DRI reactor & discharge of hot DRI to EAF)		• Pneumatic transfer to EAF • Discharge route to briquetting system • Briquetting feeding system • Briquetting system • Reduction gas circuit • CO2 removal unit • Process gas heater • Reformer system • Heat Recovery System • Process Gas Compressors • Blowers • Seal Gas System • Flue Gas Fan/ Hot Fan • Process valves • Critical bellows • Critical refractories • Natural Gas pre-treatment system • Level-II automation
12	**Oxygen Plant 700 tpd & Above** (Boundary limit: Water, Power at oxygen plant boundary)	30%	• Main Air Compressor • Booster Air Compressor • Expansion Turbine • Reboiler • Cryogenic Pumps • Heat exchange elements of • ASU • Pressure Column • Main Condenser, Low Pressure Column • Crude Argon Column, Pure Argon Column and Condenser with Condenser Block • Main Heat Exchangers, Pure Argon Evaporator Sub-cooler • LOX-IC-Process Pump • LIN-IC-Process Pumps • LAR-Transfer -Process Pumps • Dense Fluid Expander • Booster Heat Exchangers • Molecular Sieves Switching Valves for PPU • Critical Safety valves • Specialized valves • Control Valves • Cold box • Control Valves GOX-Product • Flow Measuring devices of Cold box • Expander - Brake Generator, Frequency Converters
13	**Steel Processing**		
13.1	**Hot Metal De- De-Sulphurization Station (HMDS) Unit with Co-Injection Process** (Hot metal from the blast furnace (BF) is	75%	• Injection Lance and automatic sampling Unit with auxiliaries • De-slagging Machines (slag raking machine) with auxiliaries

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
	received in a torpedo ladle or open-top ladle, undergoes desulfurization treatment to reduce "Sulphur (S)" content, and is then transferred to the BOF converter)		• Temp. measuring and sampling device with auxiliaries
13.2	**Hot Metal De- De-Sulphurization Station (HMDS) Unit with Mechanical Stirrer (KR) Process** (Hot metal from the blast furnace (BF) is received in a torpedo ladle or open-top ladle, undergoes desulfurization treatment to reduce "Sulphur (S)" content, and is then transferred to the BOF converter)	70%	• Impeller, Impeller lifting & stirring equipment, Guide Frame with auxiliaries • De-slagging Machines (slag raking machine) with auxiliary facilities • Temp. measuring and sampling device with auxiliaries
13.3	**Basic Oxygen Furnace / LD Unit** [Treated hot metal is poured into the BOF converter, where it undergoes processing to convert it into steel, which is then supplied to the ladle furnace (LF)]	65%	• Lance body with clamping, Lance carriage, Lance guide, Lance hoist & trolley, Lance copper tips with auxiliaries. • Pneumatic motors for emergency tilting drive. • Bottom stirring system, valve station & rotary joint along with auxiliaries • Valve stations for oxygen/ argon/ nitrogen with auxiliaries • Sub-lance system with auxiliaries • Container lab with all auxiliaries. • Automatic gas coupling (auto coupler) with auxiliaries. • Converter wrecking machine. • Converter tap hole changing machine • Refractory monitoring (laser) machine. • Converter Shell parts, Suspension System, Rotary joint, Slag Stopper & its control valves • Converter Tilting Drive system & Suspension system, gearboxes & Motors, Pneumatic Motors & control valves, Position Encoders, Clutch system, Lubrication system components. • Ladle Transfer Car Rail Track System (A series type) & gearboxes, stirring couplings. • LOMAS Gas Analyzer, Multi-lab temperature & sample system. • Stirring couplings for ladle transfer Cars. • PLCs and RIOs. • Automation system and software. • Hot Zone Hydraulic Pumps and Valves. • Hot Zone Geared Motors with wheel block. • Converter Bearings. • Air & Electric operated Slurry Compaction Pump. • Primary ID fan, bearings, motors, drives & Lubrication system.

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
			• WDS-Cone
13.4	**Electric Arc Furnace Unit** (Primary materials such as scrap, DRI, pig iron, and hot metal in combination is converted into liquid steel using electrical energy to melt and refine the raw materials)	70%	• Electrode regulation system with auxiliaries • High current system including furnace transformer • Oxygen & Carbon Injection System with auxiliaries • Manual Temp Measuring & sampling Lance with auxiliaries
13.5	**Ladle Furnace Unit** [Liquid steel is processed/ treated to achieve the desired grade and held as buffer stock before being supplied to the continuous casting machine (CCM)]	70%	• Electrode regulation system with auxiliaries • Manual Temp Measuring & sampling Lance with auxiliaries.
13.6	**RH/ RH-OB Unit** [The liquid steel is degassed to achieve the required dissolved gas levels and then supplied to the continuous casting machine (CCM)]	65%	• Gas Stirring System/ Lift Gas Stirring System Valve Stand with auxiliaries • Oxygen Lance System with auxiliaries • Hydris Measurement System with auxiliaries
13.7	**Argon-Oxygen Decarburization (AOD) Unit**	70%	• Drive Unit for tilting of AOD converter, Air Motor, Brakes etc. • Lance copper tips • Hoses for water and oxygen • Pneumatic motors for emergency tilting drive. • Bearing for AOD Converter, Emergency Gears for air motor • Valve stations for oxygen/ argon/nitrogen with auxiliaries. • Refractory monitoring (laser) machine • Automation system.
13.8	**VD/VOD**	70%	• Gas analysis (Off-Gas Mass Spectrometers) only sensor. Holder is make in India • Automation and Process control software platform • Vacuum Pump System with Auxiliary • Oxygen tips • Valve stations for oxygen/ argon/nitrogen with auxiliaries.
13.9	**Submerged Arc Furnace (SAF) Unit**	65%	• Clay gun and drill M/c • Electrode equipment • Slipping device assembly • Electrode guiding assembly • Upper & Lower mantle assembly • Pressure ring assembly • Contact shoe assembly • Heat shield assembly • Electrode seal assembly • Pressure ring bellows • Seal refractory • Furnace automation and Controller Software

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
13.10	**Continuous Casting Unit** (Slab Caster/ Billet/ Bloom Round/ Combi/ Beam Blank) [The liquid steel is cast into slabs, billets, or blooms in the continuous casting machine (CCM)]	65%	• Ladle slag detection system completes with auxiliaries • Copper tube and Plate, Mould oscillation Cylinder. • Rotary Union. • Continuous temperature measuring system with auxiliaries. • Torch cutting machine/ Emergency torch cutter along with auxiliaries • De-burring machine along with electrical drive system with auxiliaries • Marking machine. • Roll gap checker completes with auxiliaries • Electromagnetic Stirrer (EMS)/ Electromagnetic Braking (EMBr) system along with auxiliaries
14	**Flat Product Mills**		
14.1	**Hot Strip Mills/ Plate Mill** (Boundary Limit: Slab yard to Dispatch Bay, including auxiliaries)	50%	• De-scalars, mill stand, bed plates, backup rolls, Work Rolls, mill spindles, chocks, AGC cylinders, bending blocks & cylinders, shears, down coilers, anti-friction roll neck bearings, oil film bearings, mill reducers, load cells, thickness gauge, profile gauge, width gauge, levelers, roll grinding machines, Coil Marking Machine, Plate Marking Machine, mill stand motors & mill stand MV drive system, automation system, etc.
14.2	**CRM (PLTCM)** (Boundary Limit: Pickling line entry to mill exit)	50%	• Welding machine, tension leveler, mill stands, backup rolls, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, roll bending and roll shifting cylinders, mill spindles, load cells, position transducers, Electrostatic Oiler, Side Trimmer, Steering System, Surface Inspection System, thickness gauges, laser speed gauge, tensiometer, Flatness Gauge, tension reel, mill reducers, mill stand motors & mill stand MV drive system, automation system etc.
14.3	**CRM (HDGL)** (Boundary Limit: entry to exit of HDGL including temper mill & tension leveler)	60%	• Welding machine, radiant tube furnaces, jet cooling system, coating pot with induction heating, pot rolls, air knife wiping system, tension leveler, width gauge, thickness gauge, coating thickness gauge, load cells, roll force cylinders, mill stand motors & mill stand drive system, automation system, etc.
14.4	**CRM (SPM)** (Boundary Limit: entry to exit of SPM)	50%	• Mill stands, backup rolls, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, mill spindles, Electrostatic Oiler, Coil Marking System, load cells, thickness gauge, mill stand motors & mill

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
			stand MV drive system, automation system, etc.
14.5	**CRM (Bell Annealing Furnace)** (Boundary Limit: From furnace bases to post cooling equipment)	55%	• Furnace, automation system, etc.
14.6	**CRM (Color Coating Line)** (Boundary Limit: Entry to exit of CCL)	80%	• Coater, Coating thickness gauge, digital printer, tension leveler, automation, etc.
14.7	**TSCDR (Thin Slab casting Direct Rolling)** (Boundary Limit: From turret to coil finishing & packaging area)	50%	• Ladle slag detection system complete with auxiliaries • Copper tube and Plate, Mould oscillation Cylinder. • Rotary Union. • Continuous temperature measuring system with auxiliaries. • Pendulum shear cutting machine. • Segments assembly • Roll gap checker complete with auxiliaries • Electromagnetic Stirrer (EMS)/Electromagnetic Braking (EMBr) system along with auxiliaries, • Tunnel furnace burners • Roughing & Finishing Mill stands, work roll & backup rolls, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, mill spindles, mill stand MV drive and motors, automation system, laminar/power cooling components, hydraulic coilers. Profile gauge, thickness gauge, width gauge. • Nozzles • Grease system and auxiliaries • Hydraulic system and auxiliaries • Gearbox • ROT roll assembly • Roll assembly (Sleeve, Shaft, Roll) • Ladle turret and auxiliaries (Slew bearing, Disc coupling, Gearbox, Hydraulic clutch and Hydraulic Cylinder) • Mould breakout prediction system • Auto mould level control nucleonic gauge • Mould powder feeding system • CNC mould machining system with auxiliaries • Tundish and Turret weighing system • Tunnel furnace refractory rolls. • Tunnel furnace shuttle drive system and gas conveying system. • Backup roll hydrostatic lubrication system • Roll bite lubrication system • In-furnace camera with auxiliaries • Crop shear • Descaler system and component. • Coil marking machine

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
			• Online Coil weighing system • Cut to Length Stacker System • Roll Shop (CNC Combi grinders, CNC Roll Grinders, CNC Knife Grinders, CNC Turing Machine, Lathe Machines) • Coil Strapping machines • Down coiler system • Mill Measuring system and Sensors (Automatic gauge control (AGC) sensors (roll force, gap, pressure) • Looper Control System along its sensors • Condition based monitoring System and its sensors • Coil shuttle car and pallet conveying system. • Crane coil tong. • RO and UF membranes • Self-cleaning filters
14.8	**Normalizing Facilities for Plate Mill** (Boundary Limit: entry to Normalizing furnace to dispatch of finished plates)	50%	• Furnace burners, Furnace hearth rollers, leveler, load cell, automation
14.9	**SSM (Silicon Steel Mill)** (Boundary Limit: Pickling line entry to dispatch of SSM)	50%	• Mill stand, work roll & backup roll, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, mill spindles, mill stand MV drive system & motors, automation system, annealing furnace, decarburizing line, electrical steel testing facilities (e.g. Fischer scope thickness measuring device, Frankline Insulation Resistivity Tester, Magnetic Console, Stacking Factor tester).
14.10	**CRM (Cluster Mill stand)** Sendzimir Mill (Boundary Limit: entry to exit of Sendzimir Mill)	50%	• Sendzimir Mill stand, work roll & backup rolls, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, mill spindles, mill stand MV drive system & motors, automation system
14.11	**HRM (Steckel Mill)** (Boundary Limit: From coiler furnace entry to Steckel Mill and exit to coiler furnace)	40%	• Steckel Mill stand, heated coilers, work roll & backup rolls, antifriction bearings, oil film bearings, roll chocks, roll force cylinders, mill spindles, mill stand MV drive system & motors, automation system
15	**Long Product Mills**		
15.1	**Bar Mill/ WRM/MM/ LSM** (Boundary Limit: From furnace entry to dispatch)	75%	• Fast finishing blocks, Roll turning lathes, Profile Gauge, automation systems, etc.
15.2	**Rail Mill/ Heavy Structural Mill** (Boundary Limit: From furnace entry to exit of the rail welding plant excluding material handling)	45%	• Mill stands, mill motor & drive system, heat treatment facility, straightening machine, NDT facilities, welding machine, Profile Gauge, Hot Saw, Cold Saw, Hot Marking Machine, Roll Turning Lathe, Saw Grinding Machine, automation system, etc.
15.3	**ERWPP (Electrical Resistance Welded Pipe Plant)**	50%	• Pre-forming Unit, Break-Down Stand, Edge Bender, Universal Cage, Finishing Pass

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
	(Boundary Limit: From strip feeding to finishing facilities and dispatch of ERWPP)		(multiple stands), Pipe Guide, high frequency welding machine, high power electric inductors, hydro testing, ultrasonic machine
15.4	**SWPP (Spiral Welded Pipe Plant)** (Boundary Limit: From pipe forming to finishing facilities and dispatch of SWPP)	50%	• Submerged arc welding, outside welding (skelp joint), X-ray station, hydro testing, beveling machine, ultrasonic machine, end radiograph station
16	**Wheel Plant**		
16.1	**Wheel Plant** (receipt of round/ingot to finished wheel)	30%	• Circular saw, forging press, wheel rolling mill, wheel dishing press, wheel stamping machine, rim spaying machine, mobile chargers, (Handling Robots), machining facilities, testing facilities, automation system etc.
16.2	**Heat Treatment Facilities for Railway Wheels** (Boundary Limit: exit of Hot Dimension Measurement to Black Wheel Storage)	40%	• Furnace burners, hearth rollers, automatic wheel handling and quenching machine
16.3	**Non-Destructive Testing (NDT) Facilities for Wheels and Rails** (Boundary Limit: entry & exit of NDT facilities)	30%	• Hardness testing machine, Ultrasonic testing machine, Magnetic particle inspection machine, Eddy current testing machine
16.4	**Facilities for Manufacturing of Forged Rolls for Rolling Mill Stands** (Boundary Limit: entry of forged blank roll to dispatch of finished rolls)	30%	• Forging Press, Manipulators, roll hardening machine, Cryogenic treatment facilities, tempering furnaces, roll grinders, roll turning lathes, hardness testing machine, ultrasonic testing machine
16.5	**RGBS/ Roll Shop**	50%	• CNC work roll grinder/CNC combi grinder, CNC Roll turning lathe, • Facilities for Electric Discharge Texturing (EDT) and Electro Discharge Machining (EDM) for rolls
17	**Refractory Brick** (Receipt of raw material to finished brick)	50%	• Hydraulic Press
18	**Electrical** (Power Quality System)	30%	• MVSTATCOM • (Static Synchronous Compensator) System
	Other auxiliary and utility equipment		
19	**Calcination Plant** (Calcined Lime & Dolo)		• Firing system, Shaft level indicator, Automation system • VFD & Soft Starter Cards. Driving Air Blower, Dedusting Draft Fans, Cooling Air Fans, Lime Cooling Fan, Waste Gas Fans, Gas Booster Fan assembly • Hyd. Cylinders, Hyd. Motors, Hyd. Station.
20	**Electric Motor Driven Cold Blast Blower** (Axial/Axial with last stage radial)		• Axial/ Axial with last stage radial Blower • Motor with Drive System • Blow-off Valve • Blower non-return valve • Control & Instrumentation items

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
21	**Steam Turbine Driven Cold Blast Blower** (Axial/Axial with last stage radial)		• Axial/ Axial with last stage radial Blower • Blow-off Valve • Blower non-return valve • Control & Instrumentation items
22	**Diesel Engine Driven Cold Blast Blower** (Axial/Axial with last stage radial/radial)		• Axial/ Axial with last stage radial Blower/radial Blower and Systems • Diesel Engines • Blow-off Valves • Blower non-return valves • Control & Instrumentation items
23	**Gas Fired/ Heat Recovery Boilers**		• Special Grade Plates & Tubes • Flame Scanner • Instrumentation & controls
24	**Steam Turbine** (Extraction/ BPTG)		• Special Grade Blade Material • Governing System • Turbo Supervisory system • Instrumentation & controls
25	**Gas Holder**		• Gasholder seal, sealant. • Level weight ropes with fittings. • V. R. Valve gaskets • Specialized membranes for double/triple membrane system. • Hydraulics
26	**High pressure gas boosters** (Outlet pressure > 2000 mm WC)		• Gas booster proper including control and bypass valves • Piston Rings • Concentric Ring Type Valves (SS)
27	**Pollution Control Systems**		• TR sets • Controllers • Insulators • ESP electrical components • Control & Instrumentation items
28	**Water & Effluent Treatment System**		• Membranes • Evaporators (Compressor & Titanium Sheet) • HP Pumps • Control & Instrumentation items
29	**Compressed Air Station**		• Centrifugal Compressor core assembly including Impellors, Bull Gear, Pinion Shafts, Bearings, Vibration Probes and Local Control Panel.
30	**Hydrogen Plant**		• Electrolyser unit • HP Compressors • Control & Instrumentation items
31	**Packaged Chillers**		• Compressors • Control & Instrumentation items
32	**Other Utility areas like**– Air conditioning & ventilation system, VAM based chiller system, firefighting system, gas boosters (DP less than 2000 mm WC), cooling water system (pumping station, filters, cooling		• Items / Equipment have sub-components / parts which are imported • Compressors, Chillers, Crane AC units, Expansion Valve, Instruments, High Temperature Application AC

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
	towers, heat exchangers, etc.), gas mixing stations, pollution control systems, inter plant piping system		
33	**Electric overhead travelling crane and gantry crane, electric hoist**		• Barrel coupling, heavy duty bearing, crane rail lubrication, slew ring bearings, tongs
34	**Engineering shop**		• CNC lathe, CNC milling machine
35	Power Generation, transmission & Distribution system; Shop Electrics including Power & control system and associated electrical works	As per Minimum local content (MLC) % guideline of Ministry of Power	
Note: All equipment shall be procured/ complied as per the Class-I category of the Ministry of Power guidelines. In case(s) where the equipment is not mentioned in Class-I category, or where classification/specification of the equipment is not explicitly or clearly defined under the Ministry of Power guidelines, the provisions issued by DPIIT for Class-I and Class-II categories shall accordingly be followed.			
36	**Instrumentation items/ equipment ****	As per DPIIT guideline *	• Above / under burden probe system • Profilometer • Burden camera • Tuyere phenomena detection system (TPDS) • Top gas analyzers (CO, CO_2, H_2, O_2, pollutants) • Flow jam switch • Elemental analyzers • Moisture analyzer (Nucleonic) • CV analyzer • Thickness gauge • Hot metal detector • Width gauge • Furnace camera • Multifunction profile gauge • Flatness/shape gauge • Surface inspection system • Laser doppler velocity meter • Optical barrier • Thermal imaging systems for hot rolling • Automatic gauge control (AGC) sensors (roll force, gap, pressure) • Online mechanical property prediction systems (AI + sensors) • Oil film thickness monitoring systems (cold rolling) • X-Ray or Nucleonic Based Coating Thickness Gauges • Mass flow meter • Hydris (hydrogen detection in molten steel) • Mold level measurement • Break-Out Prediction System (BOPS) • Electromagnetic Brake (EMBr) Control & Sensors • Ladle tracking and management system • Slag Detection System (SDS)/ Slag Monitoring Systems

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
			• BOF Endpoint Detection (Laser-Induced Breakdown Spectroscopy – LIBS) • Sub-Lance Systems (Temp + O_2 + Carbon + Sampling) • Ladle Refractory Wear Monitoring (Laser/Ultrasonic/Infrared) • Continuous Emissions Monitoring Systems (CEMS – imported analyzers for SOx, NOx, PM, CO, CO_2, O_2, H2) • Off-gas analyzer for BOF/ EAF (CO, CO_2, H_2, dust) • Water quality analyzers (pH, Conductivity, Oil-in-water, TOC, Silica, BOD, COD, TSS, TDS, Phenol, Cyanide) • Laser-based gas leak detectors (CH_4, CO, H_2, H2S) • Acoustic / ultrasonic leak detection • Vibration / condition monitoring sensors / Axial shift / Differential expansion monitoring systems • Anti-collision system (Radar/ Laser/ Lidar) • Oven Identification System (OIS) • Pyrometers • LOMAS Analyzers • Master calibrators for pressure, temperature and electrotechnical parameters • Instruments installed in Eirich Mixers in Sinter plant, and Hanzel make lubrication systems. • Governor systems for Turbines and Turbo-blowers • Tail gas analyzers for By-product plant • Force sensors used in Coke bucket Lifter & reversing winch • Encoders, • Hydraulic valve controllers • Instruments installed in BLTs (Tilt switch, sonic sensor, encoders, etc.) • Flame sensors/scanners
37	**Automation items/ equipment ****	As per DPIIT guideline *	
38	**Voice Communication system ****	As per DPIIT guideline *	
39	**Fire Detection and Alarm (FDA) system ****	As per DPIIT guideline *	
40	**CCTV system ****	As per DPIIT guideline *	

S. No.	Plant /Unit package	Minimum domestic content of Capital Goods (%)	Importable Items
Note:			
* Instrumentation, automation, communication equipment, Fire Detection & Alarm (FDA) system, and CCTV system shall comply with the domestic content requirements for capital goods in line with Class-I and Class-II supplier norms as per DPIIT as well as MEITY guidelines.			
** Highly specialized equipment, components, and critical parts such as semiconductor chips for instrumentation, automation, communication systems, fire detection & alarm (FDA) systems, and CCTV systems are currently being sourced from global technology leaders. However, the overall system assembly, integration, and manufacturing activities are being carried out in India, with the remaining components procured through domestic sources.			

Appendix-C

Promotion of Indigenous Technologies in Iron & Steel Sector

1) **Objective:**
To promote self-reliance in the Indian iron and steel sector by incentivizing the adoption, development, and scale-up of indigenous technologies across all stages of steel manufacturing.

2) **Scope:**
This policy applies to Central Public Sector Enterprises involved in steelmaking or putting up a steel manufacturing plant.

3) **Policy Directives:**

3.1 In cases where technology and proof for earlier engineering & supply is available but does not match the present capacity requirement, following conditions will be applicable for indigenous technology providers:

3.1.1 Production capacity reference to be 30% of the capacity of the proposed plant.

3.1.2 Availability of demonstrable tie ups with the vendors.

3.1.3 Experience of detailed engineering of projects for at least 75% of the capacity of the proposed plant.

3.2 In cases where technology is available but no reference for earlier supply is available, following conditions will be applicable for indigenous technology providers:

3.2.1 The indigenous technology supplier has done detailed engineering of projects matching at least 75% of the features of the proposed project.

3.2.2 The indigenous technology supplier has done detailed engineering matching 100% of the critical features of the proposed project.

3.2.3 Availability of demonstrable tie ups with the vendors.

3.2.4 Demonstrable evidence of technology availability (IPR or other sufficient evidence).

3.3 In cases where no Indian technology is available, a foreign technology supplier committing to transfer technology, including training and handholding to an Indian CPSE (including the procuring entity), within three years, shall be considered as deemed Class-I supplier irrespective of percentage of Domestic Value Addition. In this case, purchase preference shall be given to the foreign technology supplier as defined in DPIIT's Public Procurement (Preference to Make in India) Order amended from time to time.

4) **Implementation Oversight:**
The Standing Committee constituted by Ministry of Steel shall monitor implementation, resolve disputes, and update the eligibility and incentive criteria periodically.

Form-1

Affidavit of Self-Certification for Compliance with Melt & Pour Requirements (Appendix-A) and/or Domestic Value Addition Requirements (Appendix-A & Appendix-B*)

*For Appendix-B capital goods, this affidavit must accompany the statutory auditor's / cost auditor's / CA certificate, as mandated under the policy.

I, _____, Resident of _____, being the authorised signatory of M/s _____,

do hereby solemnly affirm and declare as under:

1. I have read and understood the Domestically Manufactured Iron & Steel Products (DMI&SP) Policy, 2025, issued vide Notification No. _____ dated _____. I agree to abide by all terms and conditions of the said policy and the tender in which this affidavit is submitted.

2. This affidavit pertains to the following iron & steel product(s)/capital good(s):

Name of product(s): _____

HS Code(s): _____

Appendix classification: Appendix-A / Appendix-B (select as applicable)

Procuring agency: _____

3. Melt & Pour - Applicable only for Appendix-A items with Melt & Pour condition

I hereby declare that the above product(s) satisfy the Melt & Pour in India requirement as notified in Appendix-A. Specifically:

The steel was melted and poured in India.

The first solid shape (slab/billet/ingot/other) was produced at the following location(s):

Steelmaking facility: _____Location: _____ Heat numbers; Batch details: _____

I undertake to produce mill test certificates, heat records, and any other documentary proof to substantiate this declaration whenever required by the procuring agency.

(If not applicable, write "Not Applicable".)

4. Domestic Value Addition - Applicable for Appendix-A DVA items and Appendix-B capital goods:

I hereby declare that the Domestic Value Addition (DVA) for the product(s) is: _____ %. The DVA has been computed as per DPIIT guidelines and the formula specified in the DMI&SP Policy, 2025.

4A. For Appendix-B Capital Goods (Mandatory): A certificate issued by the statutory auditor / cost auditor / chartered accountant is enclosed herewith, confirming the DVA of the capital good package in accordance with the policy.

(If Appendix-A item only, strike this clause out.)

5. I confirm that: All information furnished is true and correct. All input steel costs, imported content, and domestic content calculations have been verified. All manufacturing, purchase, and pricing records are available for examination.

If any information is found incorrect or misleading: The procuring agency may disqualify me / my firm from Government tenders as per the procuring agency norms. I agree to pay all assessment costs and penalties, including forfeiture of EMD, as per policy and tender conditions.

6. I undertake to maintain the relevant records, and make them available to any statutory authority.

7. Declaration: I do hereby declare that the statements made above are true to the best of my knowledge and belief. I understand that any misrepresentation shall attract penalties under the DMI&SP Policy, applicable laws, and tender conditions.

For and on behalf of

(Place & Date)

M/s _____

(Authorised Signatory)

[F. No. 8(2)/2023-ID-I]

ABHIJIT NARENDRA, Jt. Secy.

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FORMS & FORMAT

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BIDDER'S GENERAL INFORMATION

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

1	Bidder Name	M/s……..
2	Status of Firm	Proprietorship Firm/Partnership firm/ Limited Liability Partnership (LLP) firm/Public Limited/ Pvt. Limited/ Govt. Dept. / PSU/ Others If Others Specify:_____ [Enclose relevant certificates / partnership deed/certificate of Registration, as applicable]
3a	Name of Proprietor/ Partners/ Directors of the firm/company	1. 2. 3.
3b	Name of Power of Attorney holders of bidder	
4	Number of Years in Operation	
5	Address of Registered Office:	
		City:
		District:
		State:
		PIN/ZIP:
6	Bidder's address where order/contract is to be placed	
		City:
		District:
		State:
		PIN/ZIP:
7	Office responsible for executing the contract with GST no. * (In case supply of works are from multiple locations, addresses and GST no. of all such locations are to be provided).	City: District: State: PIN/ZIP: GST No.:
8	Telephone Number/ Mobile no. of address where order is to be placed	_____ (Country Code) (Area Code) (Telephone No.)

9	E-mail address	
10	Website	
11	Mobile Number:	
12	ISO Certification, if any	{If yes, please furnish details}
13	PAN No.	
14	GST No.(refer sl. no. 7above)	
15	EPF Registration No.	
16	ESI code No.	
17	Void	
18	Whether Bidder is Startups or not	Yes / No (*If Yes, Bidder to submit requisite documents as specified it ITB: Clause No.50*)
	In case of Start-up confirm the following: (i) Date of its incorporation/ registration [The certificate shall only be valid for the entity upto ten years from the date of its incorporation/ registration] (ii) Whether turnover for any financial years since incorporation/ registration has exceed Rs.100 Crores.	

Note: * IGGL *intent to place the contract directly on the address from where Works are to be supplied. In case, bidder wants contract at some other address or Works are to supplied from multiple locations, bidder is required to provide in their bid, the address on which contract is to be placed.*

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

FORMAT F-2
PROFORMA OF "BANK GUARANTEE"
FOR "EARNEST MONEY / BID SECURITY"
(To be stamped in accordance with the Stamp Act)

To, M/s Indradhanush Gas Grid Limited _____	**Bank Guarantee No.**	
	Date of BG	
	BG Valid up to	
	Claim period up to (There should be three months gap between expiry date of BG & Claim period)	
	Stamp Sl. No./e-Stamp Certificate No.	

Dear Sir(s),

In accordance with Letter Inviting Tender under your reference No _____ M/s. _____ having their Registered / Head Office at _____ (hereinafter called the Tenderer), wish to participate in the said tender for_____

As an irrevocable Bank Guarantee against Earnest Money for the amount of _____ is required to be submitted by the Tenderer as a condition precedent for participation in the said tender which amount is liable to be forfeited on the happening of any contingencies mentioned in the Tender Document.

We, the _____ Bank at _____having our Head Office _____ (Local Address) guarantee and undertake to pay immediately on demand without any recourse to the tenderers by Indradhanush Gas Grid Limited , the amount _____ _____ without any reservation, protest, demur and recourse. Any such demand made by IGGL, shall be conclusive and binding on us irrespective of any dispute or difference raised by the Tenderer.

This guarantee shall be irrevocable and shall remain valid up to _____ [this date should be two (02) months beyond the validity of the bid].If any further extension of this guarantee is required, the same shall be extended to such required period on receiving instructions from M/s. _____ whose behalf this guarantee is issued.

In witness whereof the Bank, through its authorized officer, has set its hand and stamp on this _____day of _____ 20__ at _____.

Notwithstanding anything contained herein:

a) The Bank's liability under this Guarantee shall not exceed (currency in figures) . . . . . (currency in words only) . . . . .
b) This Guarantee shall remain in force upto _____ (this expiry date of BG should be two months beyond the validity of bid) and any extension(s) thereof; and
c) The Bank shall be released and discharged from all liability under this Guarantee unless a written claim or demand is issued to the Bank on or before the midnight of …….(indicate date of expiry of claim period which includes minimum three months from the expiry of this Bank Guarantee) and if extended, the date of expiry of the last extension of this Guarantee. If a claim has been received by us within the said date, all the rights of IGGL under this Guarantee shall be valid and shall not cease until we have satisfied that claim.

Details of next Higher Authority of the Officials who have issued the Bank Guarantee:

Name …….
Designation ……..

WITNESS:

(SIGNATURE)
(NAME)

(SIGNATURE)
(NAME)
Designation with Bank Stamp

(OFFICIAL ADDRESS)

Attorney as per
Power of Attorney No. _____
Date: _____

INSTRUCTIONS FOR FURNISHING "BID SECURITY / EARNEST MONEY" BY "BANK GUARANTEE"

1. The Bank Guarantee by Bidders will be given on non-judicial stamp paper as per "Stamp Duty" applicable. The non-judicial stamp paper should be in the name of the issuing Bank.

2. The expiry date should be arrived at in accordance with "ITB: Clause-16.1".

3. The Bank Guarantee by bidders will be given from Bank as specified in "ITB:Clause-16.2".

4. A letter from the issuing Bank of the requisite Bank Guarantee confirming that said Bank Guarantee / all future communication relating to the Bank Guarantee shall be forwarded to the Employer at its address as mentioned at "ITB".

5. Bidders must indicate the full postal address of the Bank along with the Bank's E-mail / Phone from where the Earnest Money Bond has been issuedas per proforma provided below.

6. If a Bank Guarantee is issued by a commercial Bank, then a letter to Employer confirming its net worth is more than Rs. 1,000,000,000.00 [Rupees One Hundred Crores] or equivalent alongwith documentary evidenceor in the Bank Guarantee itself.

7. **THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:**

"BG issuance message (IFN 760 / IFN760COV For issuance of BG and IFN 767 / IFN 767 COV FOR Amendment of BG) is to be transmitted through SFMS to beneficiary's bank as below:
Name of Bank: Axis Bank
Branch: Guwahati
Branch Address: Chhibber House, Ground Floor, G.S Road, Guwahati -781005
IFSC: UTIB0000140
SWIFT Code: AXISINBB140
The issuing bank while issuing/amending the BG, should ensure that the below information is correctly captured in the message i.e., IFN 760 / IFN 760COV / IFN 767/ IFN 767COV:

Field Number	Particulars
7037	IGGL938956645

NOTE: THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:

(i) IFN 760 / IFN 760COV FOR ISSUANCE OF BANK GUARANTEE

(ii) IFN 767 / IFN 767 COV FOR AMENDMENT OF BANK GUARANTEE

(iii) THE ABOVE MESSAGE / INTIMATION SHALL BE SENT THROUGH SFMS BY THE BG ISSUING BANK TO AXIS BANK, GUWAHATI BRANCH, IFS CODE – UTIB0000140; BRANCH ADDRESS: Axis Bank, Chhibber House, Ground Floor, G.S Road, Guwahati -781005

(iv) THE SUPPLIER SHALL SUBMIT TO IGGL THE COPY OF SFMS MESSAGE AS SENT BY THE ISSUING BANK ALONG WITH THE ORIGINAL BANK GUARANTEE

MATTER TO BE MENTIONED IN COVERING LETTER TO BE SUBMITTED BY VENDOR ALONG WITH BANK GUARANTEE

1	**BANK GUARANTEE NO**	**:**				
2	**VENDOR NAME / VENDOR CODE**	**:**	**NAME**			
			VENDOR CODE			
3	**BANK GUARANTEE AMOUNT**	**:**				
4	**TENDER NO**	**:**				
5	**NATURE OF BANK GUARANTEE**	**:**				
	(Please Tick (√) Whichever is Applicable		**PERFORMANCE BANK GUARANTEE**	**SECURITY DEPOSIT**	**EMD**	**ADVANCE**
6	**BG ISSUED BANK DETAILS**					
		(A)	**EMAIL ID :**			
		(B)	**ADDRESS :**			
		(C)	**PHONE NO :**			

FORMAT F-2A
DECLARATION FOR BID SECURITY

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Dear Sir

After examining / reviewing provisions of above referred tender documents (including all corrigendum/ Addenda), we M/s_____ ***(Name of Bidder)*** have submitted our offer/ bid no. …….

We, M/s_____ ***(Name of Bidder)*** hereby understand that, according to your conditions, we are submitting this Declaration for Bid Security.

We understand that we will be put on watch list/holiday/ banning list (as per polices of IGGL in this regard), if we are in breach of our obligation(s) as per following:

(a) have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or

(b) having been notified of the acceptance of our Bid by the IGGL during the period of bid validity:
  (i) fail or refuse to execute the Contract, if required, or
  (ii) fail or refuse to furnish the Contract Performance Security, in accordance provisions of tender document.
  (iii) fail or refuse to accept 'arithmetical corrections' as per provision of tender document.

(c) having indulged in corrupt/fraudulent /collusive/coercive practice as per procedure.

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

FORMAT F-2B

PROFORMA OF "INSURANCE SURETY BOND" FOR "EARNEST MONEY DEPOSIT/ BID SECURITY"

(To be stamped in accordance with the Stamp Act)

To, M/s Indradhanush Gas Grid Limited _____	**Insurance Surety Bond No.**	
	Date of ISB	
	ISB Valid up to (Expiry date)	
	Claim period up to (indicate date of expiry of claim period which includes minimum three months from the expiry date)	
	Stamp Sl. No./e-Stamp Certificate No.	

Dear Sir(s),

In accordance with Tender Document under your reference No _____ M/s. _____ having their Registered / Head Office at _____ (hereinafter called the Tenderer/Bidder), wish to participate in the said tender for

_____

As an irrevocable Insurance Surety Bond against Earnest Money Deposit for the amount of _____ is required to be submitted by the Bidder as a condition precedent for participation in the said Tender Document which amount is liable to be forfeited on the happening of any contingencies mentioned in the Tender Document.

We, the _____ [Name & address of the Insurer] at _____having our Head Office _____ (Local Address) guarantee and undertake to pay immediately on demand without any recourse to the Bidder by Indradhanush Gas Grid Ltd., the amount _____ _____ without any reservation, protest, demur and recourse. Any such demand made by Indradhanush Gas Grid Ltd., shall be conclusive and binding on us irrespective of any dispute or difference raised by the Bidder.

This Insurance Surety Bond shall be irrevocable and shall remain valid up to _____ [this date should be two (02) months beyond the validity of the bid]. If any further extension of this Insurance Surety Bond is required, the same shall be extended to such required period on receiving instructions from Bidder M/s. _____ on whose behalf this Insurance Surety Bond is issued.

Notwithstanding anything contained herein:

a) The Insurer's liability under this Insurance Surety Bond shall not exceed (currency in figures) . . . . . (currency in words only) . . . .

b) This Insurance Surety Bond shall remain in force upto _____ (this expiry date should be two months beyond the validity of bid) and any extension(s) thereof; and

c) The Insurer shall be released and discharged from all liability under this Insurance Surety Bond unless a written claim or demand is issued to the Insurer on or before the midnight of …….(indicate date of expiry of claim period which includes minimum three months from the expiry of this Insurance Surety Bond) and if extended, the date of expiry of the last extension of this Insurance Surety Bond. If a claim has been received by us within the said date, all the rights of Indradhanush Gas Grid Limited under this Insurance Surety Bond shall be valid and shall not cease until we have satisfied that claim.

In witness whereof the Insurer, through its authorized officer, has set its hand and stamp on this _____day of _____ 20__ at _____.

Details of next Higher Authority of the Officials who have issued the Insurance Surety Bond:

Name …….
Designation ……..

WITNESS:

(SIGNATURE)
(NAME)

(OFFICIAL ADDRESS)

(SIGNATURE)
(NAME)
Designation with Insurer Stamp
E-Mail ID:
Telephone/Mobile No. :
Attorney as per
Power of Attorney No. _____

Date: _____

INSTRUCTIONS FOR FURNISHING "BID SECURITY DEPOSIT/ EARNEST MONEY" BY "INSURANCE SURETY BOND"

a) The Insurance Surety Bond shall be from Insurance Regulatory and Development Authority of India (IRDAI) registered general insurance companies as per guidelines issued by Insurance Regulatory and Development Authority of India (IRDAI).

b) The Employer shall be the Creditor, the Bidder shall be the Principal debtor and the Insurance company/Insurer shall be the Surety in respect of the Insurance Surety Bond to be issued by the Insurer.

c) The Insurance Surety Bond should be on Non-Judicial stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the state(s) where the Insurance Surety Bond is submitted or is to be acted upon or the rate prevailing in State where the Insurance Surety Bond is executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Bidder/Insurer issuing the Insurance Surety Bond.

d) The expiry date should be arrived at in accordance with "ITB: Clause-16 ".

e) A letter from the issuing insurer of the requisite Insurance Surety Bond confirming that said Insurance Surety Bond / all future communication relating to the Insurance Surety Bond shall be forwarded to the Purchaser at its address as mentioned at "ITB".

f) Bidder must indicate the full postal address of the Insurer along with the Insurer's E-mail / Fax / Phone from where the Insurance Surety Bond has been issued.

MATTER TO BE MENTIONED IN COVERING LETTER TO BE SUBMITTED BY VENDOR ALONG WITH INSURANCE SURETY BOND

1	**INSURANCE SURETY BOND NO**	**:**				
2	**VENDOR NAME / VENDOR CODE**	**:**	**NAME**			
			VENDOR CODE			
3	**INSURANCE SURETY BOND AMOUNT**	**:**				
4	**TENDER NO**	**:**				
5	**NATURE OF INSURANCE SURETY BOND**	**:**				
	(Please Tick (√) Whichever is Applicable		**PERFORMANCE INSURANCE SURETY BOND**	**SECURITY DEPOSIT**	**EMD**	**ADVANCE**
6	**INSURER DETAILS**					
		(A)	**EMAIL ID :**			
		(B)	**ADDRESS :**			
		(C)	**PHONE NO :**			

F-3
LETTER OF AUTHORITY

[Pro forma for Letter of Authority for Attending 'Pre-Bid Meetings' /'Un-priced Bid Opening' / 'Price Bid Opening']

Ref: Date:
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Dear Sir,
I/We, _____ hereby authorize the following representative(s) for attending any 'Meetings [Pre-Bid Meeting]', 'Un-priced Bid Opening', and 'Price Bid Opening' against the above Tender Documents:

[1] Name & Designation _____ Signature _____
Phone/Cell:
E-mail: …….. @ ……

[2] Name & Designation _____ Signature _____
Phone/Cell:
E-mail: …….. @ ……

We confirm that we shall be bound by all commitments made by aforementioned authorised representative(s).

Place: [Signature of Authorized Signatory of Bidder]
Date: Name:
Designation:
Seal:

Note:
(i) This "Letter of Authority" should be on the **"letterhead"** of the Bidder and should be signed by a person competent and having the 'Power of Attorney' to bind the Bidder. Not more than 'two [02] persons per Bidder' are permitted to attend 'Pre-Bid Meetings' /'Un-priced Bid Opening' / 'Price Bid Opening'.
(ii) Bidder's authorized representative is required to carry a copy of this authority letter while attending the 'Pre-Bid Meetings' /'Un-priced Bid Opening.

F-4

PROFORMA OF "BANK GUARANTEE" FOR "CONTRACT PERFORMANCE SECURITY / SECURITY DEPOSIT"

(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

To, M/s Indradhanush Gas Grid Limited _____	**Bank Guarantee No.**	
	Date of BG	
	BG Valid up to	
	Claim period up to (There should be three months gap between expiry date of BG & Claim period)	
	Stamp Sl. No./e-Stamp Certificate No.	

Dear Sir(s),

M/s. _____ having registered office at _____ (herein after called the "contractor" which expression shall wherever the context so require include its successors and assignees) have been placed/ awarded the job/work of _____ vide LOA /FOA No. _____dated_____ for Indradhanush Gas Grid Limited having registered office at 7th Floor, NRL Centre , G.S. Road, Christian Basti ,Guwahati , Assam – 781005 (herein after called the "IGGL" which expression shall wherever the context so require include its successors and assignees).

The Contract conditions provide that the CONTRACTOR shall pay a sum of Rs. _____ (Rupees _____) as full Contract Performance Guarantee in the form therein mentioned. The form of payment of Contract Performance Guarantee includes guarantee executed by Nationalized Bank/Scheduled Commercial Bank, undertaking full responsibility to indemnify Indradhanush Gas Grid Limited, in case of default.

The said M/s._____ has approached us and at their request and in consideration of the premises we having our office at _____ have agreed to give such guarantee as hereinafter mentioned.

1. We _____ hereby undertake to give the irrevocable & unconditional guarantee to you that if default shall be made by M/s. _____ in performing any of the terms and conditions of the tender/order/contract or in payment of any money payable to Indradhanush Gas Grid Limited we shall on first demand pay without demur, contest, protest and/ or without any recourse to the contractor to IGGL in such manner as IGGL may direct the said amount of Rupees _____ only or such portion thereof not exceeding the said sum as you may require from time to time.
2. You will have the full liberty without reference to us and without affecting this guarantee, postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the order/contract with the said M/s. _____ and to enforce or to forbear from endorsing any powers or rights or by reason of time being given to the said M/s._____ and such postponement forbearance would not have the effect of releasing the bank from its obligation under this debt.

3. Your right to recover the said sum of Rs. _____ (Rupees _____) from us in manner aforesaid is absolute & unequivocal and will not be affected or suspended by reason of the fact that any dispute or disputes have been raised by the said M/s. _____ and/or that any dispute or disputes are pending before any officer, tribunal or court or arbitrator or any other authority/forum and any demand made by you in the bank shall be conclusive and binding. The bank shall not be released of its obligations under these presents by any exercise by you of its liberty with reference to matter aforesaid or any of their or by reason or any other act of omission or commission on your part or any other indulgence shown by you or by any other matter or changed what so ever which under law would, but for this provision, have the effect of releasing the bank.

4. The guarantee herein contained shall not be determined or affected by the liquidation or winding up dissolution or changes of constitution or insolvency of the said contractor but shall in all respects and for all purposes be binding and operative until payment of all money due to you in respect of such liabilities is paid.

5. The bank undertakes not to revoke this guarantee during its currency without your previous consent and further agrees that the guarantee shall continue to be enforceable until it is discharged by IGGL in writing. However, if for any reason, the contractor is unable to complete the work within the period stipulated in the order/contract and in case of extension of the date of delivery/completion resulting extension of defect liability period/guarantee period of the contractor fails to perform the work fully, the bank hereby agrees to further extend this guarantee at the instance of the contractor till such time as may be determined by IGGL. If any further extension of this guarantee is required, the same shall be extended to such required period on receiving instruction from M/s. _____ (contractor) on whose behalf this guarantee is issued.

6. Bank also agrees that IGGL at its option shall be entitled to enforce this Guarantee against the bank (as principal debtor) in the first instant, without proceeding against the contractor and notwithstanding any security or other guarantee that IGGL may have in relation to the contractor's liabilities.

7. The amount under the Bank Guarantee is payable forthwith without any delay by Bank upon the written demand raised by IGGL. Any dispute arising out of or in relation to the said Bank Guarantee shall be subject to the exclusive jurisdiction of courts at Guwahati.

8. Therefore, we hereby affirm that we are guarantors and responsible to you on behalf of the Contractor up to a total amount of _____(amount of guarantees in words and figures) and we undertake to pay you, upon your first written demand declaring the Contractor to be in default under the order/contract and without caveat or argument, any sum or sums within the limits of (amounts of guarantee) as aforesaid, without your needing to prove or show grounds or reasons for your demand or the sum specified therein.

9. We have power to issue this guarantee in your favor under Memorandum and Articles of Association and the undersigned has full power to do under the Power of Attorney, dated _____ granted to him by the Bank.

10. Notwithstanding anything contained herein:

a) The Bank's liability under this Guarantee shall not exceed (currency in figures) . . . . . (currency in words only) . . . . .

b) This Guarantee shall remain in force upto _____ (90 days beyond the defect liability period / Warranty / Guarantee this date should be expiry) and any extension(s) thereof; and

c) The Bank shall be released and discharged from all liability under this Guarantee unless a written claim or demand is issued to the Bank on or before the midnight of

…….(indicate date of expiry of claim period which includes minimum three months from the expiry of this Bank Guarantee) and if extended, the date of expiry of the last extension of this Guarantee. If a claim has been received by us within the said date, all the rights of IGGL under this Guarantee shall be valid and shall not cease until we have satisfied that claim.

Details of next Higher Authority of the Officials who have issued the Bank Guarantee:

Name …….
Designation ……..

Yours faithfully,

_____
Bank by its Constituted Attorney

Signature of a person duly
Authorized to sign on behalf of the
Bank

INSTRUCTIONS FOR FURNISHING
"CONTRACT PERFORMANCE SECURITY / SECURITY DEPOSIT" BY "BANK GUARANTEE"

1. The Bank Guarantee by successful Bidder(s) will be given on non-judicial stamp paper as per 'stamp duty' applicable. The non-judicial stamp paper should be in name of the issuing bank.
2. The Bank Guarantee by Bidders will be given from bank as specified in cl.no. 38.3 of ITB [Section-III] of Tender Document.
3. A letter from the issuing bank of the requisite Bank Guarantee confirming that said Bank Guarantee and all future communication relating to the Bank Guarantee shall be forwarded to Employer.
4. If a Bank Guarantee is issued by a commercial bank, then a letter to Employer and copy to Consultant (if applicable) confirming its net worth is more than Rs. 100,00,00,000.00 [Rupees One Hundred Crores] or its equivalent in foreign currency alongwith documentary evidence OR in the Bank Guarantee itself.
5. Contractor shall submit attached cover letter (Annexure) while submitting Contract Performance Security.
6. **THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:**

   "BG issuance message (IFN 760 / IFN760COV For issuance of BG and IFN 767 / IFN 767 COV FOR Amendment of BG) is to be transmitted through SFMS to beneficiary's bank as below:

Name of Bank: Axis Bank
Branch: Guwahati
Branch Address: Chhibber House, Ground Floor, G.S Road, Guwahati -781005
IFSC: UTIB0000140
SWIFT Code: AXISINBB140

The issuing bank while issuing/amending the BG, should ensure that the below information is correctly captured in the message i.e., IFN 760 / IFN 760COV / IFN 767/ IFN 767COV:

Field Number	Particulars
7037	IGGL938956645

NOTE: THE BANK GUARANTEE ISSUED BY THE BANK MUST BE ROUTED THROUGH SFMS PLATFORM AS PER FOLLOWING DETAILS:

(i) IFN 760 / IFN 760COV FOR ISSUANCE OF BANK GUARANTEE

(ii) IFN 767 / IFN 767 COV FOR AMENDMENT OF BANK GUARANTEE

(iii) THE ABOVE MESSAGE / INTIMATION SHALL BE SENT THROUGH SFMS BY THE BG ISSUING BANK TO AXIS BANK, GUWAHATI BRANCH, IFS CODE – UTIB0000140; BRANCH ADDRESS: Axis Bank, Chhibber House, Ground Floor, G.S Road, Guwahati -781005

(iv) THE SUPPLIER SHALL SUBMIT TO IGGL THE COPY OF SFMS MESSAGE AS SENT BY THE ISSUING BANK ALONG WITH THE ORIGINAL BANK GUARANTEE

MATTER TO BE MENTIONED IN COVERING LETTER TO BE SUBMITTED BY VENDOR ALONG WITH BANK GUARANTEE

1	**BANK GUARANTEE NO**	**:**				
2	**VENDOR NAME / VENDOR CODE**	**:**	**NAME**			
			VENDOR CODE			
3	**BANK GUARANTEE AMOUNT**	**:**				
4	**PURCHASE ORDER/ LOA NO**	**:**				
5	**NATURE OF BANK GUARANTEE**	**:**				
	(Please Tick (√) Whichever is Applicable		**PERFORMANCE BANK GUARANTEE**	**SECURITY DEPOSIT**	**EMD**	**ADVANCE**
6	**BG ISSUED BANK DETAILS**					
		(A)	**EMAIL ID :**			
		(B)	**ADDRESS :**			
		(C)	**PHONE NO :**			

FORMAT F-4A

PROFORMA OF "INSURANCE SURETY BOND" FOR "CONTRACT PERFORMANCE SECURITY / SECURITY DEPOSIT"

(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

To, M/s Indradhanush Gas Grid Limited _____	**Insurance Surety Bond No.**	
	Date of Insurance Surety Bond	
	Insurance Surety Bond Valid up to (Expiry date)	
	Claim period up to (indicate date of expiry of claim period which includes minimum three months from the expiry date)	
	Stamp Sl. No./e-Stamp Certificate No.	

Dear Sir(s),

M/s. _____ having registered office at _____ (herein after called the "Contractor/Supplier" which expression shall wherever the context so require include its successors and assignees) have been placed/ awarded the job/work of _____ vide PO/LOA /FOA No. _____dated_____ for Indradhanush Gas Grid Limited having registered office at 7th Floor, NRL Centre, G. S. Road, Christian Basti, Guwahati, Assam-781005 (herein after called the "IGGL" which expression shall wherever the context so require include its successors and assignees).

The Contract conditions provide that the CONTRACTOR/SUPPLIER shall pay a sum of Rs. _____ (Rupees _____) as full Contract Performance Guarantee in the form therein mentioned. The form of payment of Insurance Surety Bond executed by Insurer, undertaking full responsibility to indemnify Indradhanush Gas Grid Limited, in case of default.

The said M/s._____ (herein after called the "insurer" which expression shall wherever the context so require include its successors and assignees) has approached us and at their request and in consideration of the premises we having our office at _____ have agreed to give such guarantee as hereinafter mentioned.

1. We _____ hereby undertake to give the irrevocable & unconditional guarantee in form of Insurance Surety Bond to IGGL that if default shall be made by M/s. _____ in performing any of the terms and conditions of the tender/order/contract or in payment of any money payable to Indradhanush Gas Grid Limited we shall on first demand, pay without demur, contest, protest and/ or without any recourse to the contractor to IGGL in such manner as IGGL may direct, the said amount of Rupees _____ only or such portion thereof not exceeding the said sum as you may require from time to time.
2. You will have the full liberty without reference to us and without affecting this Insurance Surety Bond, to postpone for any time or from time to time the exercise of any of the powers and rights conferred on you under the order/contract with the said M/s. _____ and to enforce or to forbear from endorsing any powers or rights or by reason of time being given to the said

M/s._____ and such postponement forbearance would not have the effect of releasing the insurer from its obligation under this debt.

3. Your right to recover the said sum of Rs. _____ (Rupees _____) from us in manner aforesaid is absolute & unequivocal and will not be affected or suspended by reason of the fact that any dispute or disputes have been raised by the said M/s. _____ and/or that any dispute or disputes are pending before any officer, tribunal or court or arbitrator or any other authority/forum and any demand made by you to the Insurer shall be conclusive and binding. The Insurer shall not be released of its obligations under these presents by any exercise by you of its liberty with reference to matter aforesaid or any of their or by reason or any other act of omission or commission on your part or any other indulgence shown by you or by any other matter or changed what so ever which under law would, but for this provision, have the effect of releasing the insurer.

4. The Insurance Surety Bond herein contained shall not be determined or affected by the liquidation or winding up dissolution or changes of constitution or insolvency of the said supplier/contractor but shall in all respects and for all purposes be binding and operative until payment of all money due to you in respect of such liabilities is paid.

5. The Insurer undertakes not to revoke this Insurance Surety Bond during its currency without your previous consent and further agrees that the Insurance Surety Bond shall continue to be enforceable until it is discharged by IGGL in writing. However, if for any reason, the Contractor/Supplier is unable to complete the supply/work within the period stipulated in the order/contract and in case of extension of the date of delivery/completion resulting extension of defect liability period/guarantee period of the supplier/contractor fails to perform the supply/work fully, the insurer hereby agrees to further extend this Insurance Surety Bond at the instance of the Contractor/Supplier till such time as may be determined by IGGL. If any further extension of this Insurance Surety Bond is required, the same shall be extended to such required period on receiving instruction from M/s. _____ (contractor) on whose behalf this Insurance Surety Bond is issued.

6. Insurer also agrees that IGGL at its option shall be entitled to enforce this Insurance Surety Bond against the Insurer (as principal debtor) in the first instant, without proceeding against the Contractor/Supplier and notwithstanding any security or other guarantee that IGGL may have in relation to the Contractor/Supplier's liabilities.

7. The amount under the Insurance Surety Bond is payable forthwith without any delay by Insurer upon the written demand raised by IGGL. Any dispute arising out of or in relation to the said Insurance Surety Bond shall be subject to the exclusive jurisdiction of courts at Guwahati.

8. Therefore, we hereby affirm that we are guarantors and responsible to you on behalf of the Contractor/Supplier up to a total amount of _____(amount of guarantees in words and figures) and we undertake to pay you, upon your first written demand declaring the Contractor/Supplier to be in default under the order/contract and without caveat or argument, any sum or sums within the limits of (amounts of guarantee) as aforesaid, without your needing to prove or show grounds or reasons for your demand or the sum specified therein.

9. We have power to issue this Insurance Surety Bond in your favor under our Memorandum and Articles of Association, and the undersigned has full power to sign and execute documents under the Power of Attorney, dated _____ granted to him by the Insurer.

10. Notwithstanding anything contained herein:

a) The Insurer's liability under this Insurance Surety Bond shall not exceed (currency in figures) . . . . . (currency in words only) . . . . .

b) This Insurance Surety Bond shall remain in force upto _____ (this date should be 90 days beyond the expiry date of defect liability period of the Contract) and any extension(s) thereof; and

c) The Insurer shall be released and discharged from all liability under this Insurance Surety Bond unless a written claim or demand is issued to the Insurer on or before the midnight of …….(indicate date of expiry of claim period which includes minimum three months from the expiry of this Insurance Surety Bond) and if extended, the date of expiry of the last extension of this Insurance Surety Bond. If a claim has been received by us within the said date, all the rights of IGGL under this Insurance Surety Bond shall be valid and shall not cease until we have satisfied that claim.

Details of next Higher Authority of the Officials who have issued the Insurance Surety Bond:

Name …….
Designation ……..

Yours faithfully,

_____
Insurer by its Constituted Attorney

Signature of a person duly
Authorized to sign on behalf of the
Insurer

INSTRUCTIONS FOR FURNISHING
"CONTRACT PERFORMANCE SECURITY / SECURITY DEPOSIT" BY "INSURANCE SURETY BOND"

a) The Insurance Surety Bond shall be from Insurance Regulatory and Development Authority of India (IRDAI) registered general insurance companies as per guidelines issued by Insurance Regulatory and Development Authority of India (IRDAI).

b) The Employer shall be the Creditor, the Bidder shall be the Principal debtor and the Insurance company/Insurer shall be the Surety in respect of the Insurance Surety Bond to be issued by the Insurer.

c) The Insurance Surety Bond should be on Non-Judicial stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the state(s) where the Insurance Surety

Bond is submitted or is to be acted upon or the rate prevailing in State where the Insurance Surety Bond is executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Bidder/Insurer issuing the Insurance Surety Bond.

d) A letter from the issuing insurer of the requisite Insurance Surety Bond confirming that said Insurance Surety Bond and all future communication relating to the Insurance Surety Bond shall be forwarded to Purchaser.

e) Supplier/Contractor shall submit attached cover letter (Annexure) while submitting Contract Performance Security / Security Deposit.

MATTER TO BE MENTIONED IN COVERING LETTER TO BE SUBMITTED BY VENDOR ALONG WITH INSURANCE SURETY BOND

1	**INSURANCE SURETY BOND NO**	**:**				
2	**VENDOR NAME / VENDOR CODE**	**:**	**NAME**			
			VENDOR CODE			
3	**INSURANCE SURETY BOND AMOUNT**	**:**				
4	**PURCHASE ORDER/ LOA NO**	**:**				
5	**NATURE OF INSURANCE SURETY BOND**	**:**				
	(Please Tick (√) Whichever is Applicable		**PERFORMANCE INSURANCE SURETY BOND**	**SECURITY DEPOSIT**	**EMD**	**ADVANCE**
6	**INSURER DETAILS**					
		(A)	**EMAIL ID :**			
		(B)	**ADDRESS :**			
		(C)	**PHONE NO :**			

F-5
AGREED TERMS & CONDITIONS

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

This Questionnaire duly filled in, signed & stamped must form part of Bidder's Bid and should be returned along with Un-priced Bid. Clauses confirmed hereunder need not be repeated in the Bid.

Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
1	Bidder's name, Vendor Code of IGGL (if any) and address (FOA/Order shall be released in this name)	Bidder's name : IGGL's Vendor Code: Address:
2.	Bidder confirms the currency of quoted prices is in Indian Rupees.	
3.	Bidder confirms quoted prices will remain firm and fixed till complete execution of the order (except where price escalation/variation is allowed in the Tender).	
4	Bidder confirms that they have quoted **GST (CGST & SGST/ UTGST or IGST)**in Price Schedule/ SOR of Price bid.	
4.1	Whether in the instant tender services/works are covered in reverse charge rule of **GST (CGST & SGST/UTGST or IGST)** If yes, Bidder confirms that they have quoted rate of applicable GST (CGST & SGST/ UTGST or IGST**)** in Price Schedule / Schedule of Rates of Price Bid	Yes/ No
4.2	Bidder confirms that they have mentioned Harmonized System Nomenclature (HSN)/Service Accounting Code (SAC) in Price Bid	
4.3	Bidder hereby confirms that the quoted prices are in compliance with the Section 171 of CGST Act/ SGST Act as mentioned as clause no. 13.10 of ITB (Anti-profiteering clause).	
4.4	Whether bidder is liable to raise E-Invoice as per GST Act.	
	If yes, bidder will raise E-Invoice and confirm compliance to provision of tender in this regard.	
5.	Bidder confirms acceptance of relevant Terms of Payment specified in the Bid Document.	
6.	Bidder confirms that Contract Performance Security will be furnished as per Bid Document within 30 days of FOA in case of successful bidder.	

Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
7.	Bidder confirms that Contract Performance Security shall be from any Indian scheduled bank (excluding Co-operative banks and Regional Rural bank) or a branch of an International bank situated in India and registered with Reserve bank of India as scheduled foreign bank. However, in case of bank guarantees from banks other than the Nationalised Indian banks, the bank must be a commercial bank having net worth in excess of Rs 100 crores and a declaration to this effect shall be made by such commercial bank either in the Bank Guarantee itself or separately on its letterhead.	
8.	Bidders confirms compliance to Completion Schedule as specified in Bid document and the same shall be reckoned from the date of Fax of Acceptance.	
9.	Bidders confirms acceptance of Price Reduction Schedule for delay in completion schedule specified in Bid document. In case of delay, the bills / invoices shall be submitted after reducing the price reduction due to delay(refer PRS Clause).	
10.	a) Bidder confirms acceptance of all terms and conditions of Bid Document (all sections). b) Bidder confirms that printed terms and conditions of bidder are not applicable.	
11.	Bidder confirms their offer is valid for period specified in BDS from Final/Extended due date of opening of Techno-commercial Bids.	
12.	Bidder have furnished EMD/Bid Security details as under: a) EMD/ Bid Security No. & date b) Value c) Validity d) Bank Address/e-mail ID/Mobile no. [in case of BG] **OR** Bidder furnishes bid security declaration [applicable for Start-Ups (to whom exemption is allowed as per extant guidelines in vogue)]	
13.	As per requirement of tender, bidder (having status as Pvt. Ltd. or Limited company) must upload bid duly digitally signed on e-portal through class-3B digital signature (DS). In case, class of DS or name of employee or name of employer is not visible in the digitally signed documents, the bid digitally signed as submitted by the person shall be binding on the bidder.	
14.	Bidder confirms that (i) none of Directors (in Board of Director) of bidder is a relative of any Director (in Board of Director) of IGGL or (ii) the bidder is not a firm in which any Director (in Board of Director) of IGGL or their relative is a partner.	

Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
15.	All correspondence must be in ENGLISH language only.	
16.	The contents of this Tender Document have not been modified or altered by Bidder. In case, it is found that the tender document has been modified / altered by the bidder, the bid submitted by them shall be liable for rejection.	
17.	Bidder confirms that all Bank charges associated with Bidder's Bank regarding release of payment etc. shall be borne by Bidder.	
18.	**NO DEVIATION CONFIRMATION:** It may be note that any 'deviation / exception' in any form may result in rejection of bid. Therefore, bidder confirms that they have not taken any 'exception / deviation' anywhere in the bid. In case any 'deviation / exception' is mentioned or noticed, bidder's bid may be rejected.	
19.	If the Bidder becomes a successful Bidder pursuant to the provisions of the Tender Document, the following Confirmation shall be automatically become enforceable: "We agree and acknowledge that the Employer is entering into the Contract/Agreement solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood & agreed that the Government of India is not a party to the Contract/Agreement and has no liabilities, obligations or rights thereunder. It is expressly understood and agreed that the Purchaser is authorized to enter into Contract/Agreement, solely on its own behalf under the applicable laws of India. We expressly agree, acknowledge and understand that the Purchaser is not an agent, representative or delegate of the Government of India. It is further understood and agreed that the Government of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the Agreement. Accordingly, we hereby expressly waive, release and forego any and all actions or claims, including cross claims, VIP claims or counter claims against the Government of India arising out of the Agreement and covenants not to sue to Government of India as to any manner, claim, cause of action or things whatsoever arising of or under the Agreement."	
20.	Bidder to ensure all documents as per tender including clause 11 of Section III and all Formats are included in their bid	
21.	Bidder understands that Tender Document is not exhaustive. In case any activity though specifically not covered in description of 'Schedule of Rates' but is required to complete the work as per Scope of Work, Conditions of Contract, or any other part of Bidding document, the quoted rates will deemed to be inclusive of cost incurred for such activities unless otherwise specifically excluded. Bidder confirms to	

Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
	perform for fulfilment of the contract and completeness of the supplies in all respect within the scheduled time frame and quoted price.	
22.	Bidder hereby confirms that they are not on 'Holiday' by IGGL or Public Sector Project Management Consultant (like EIL, Mecon only due to "poor performance" or "corrupt and fraudulent practices") or banned by Government department/ Public Sector on due date of submission of bid. Further, Bidder confirms that neither they nor their allied agency/(ies) (as defined in the Procedure for Action in case of Corrupt/ Fraudulent/ Collusive/ Coercive Practices) are on banning list of IGGL or the Ministry of Petroleum and Natural Gas. Bidder also confirms that they are not under any liquidation, court receivership or similar proceedings or 'bankruptcy'. In case it comes to the notice of IGGL that the bidder has given wrong declaration in this regard, the same shall be dealt as 'fraudulent practices' and action shall be initiated as per the Procedure for action in case of Corrupt/Fraudulent/Collusive/Coercive Practices. Further, Bidder also confirms that in case there is any change in status of the declaration prior to award of contract, the same will be promptly informed to IGGL by them.	
23.	Bidder confirms that they have read and understood the General Conditions of Contract & no 'exception / deviation' anywhere has been taken in the same and that they shall abide by provisions of relevant GCC-Works.	
24.	Bidder certifies that they would adhere to the Fraud Prevention Policy of IGGL [available on IGGL's website] and shall not indulge themselves or allow others (working in IGGL) to indulge in fraudulent activities and that they would immediately apprise IGGL of the fraud/suspected fraud as soon as it comes to their notice. Concealment of facts regarding their involvement in fraudulent activities in connection with the business transaction(s) of IGGL is liable to be treated as crime and dealt with by the procedures of IGGL as applicable from time to time.	
25.	Bidder confirms that (i) any variation in GST at the time of supplies for any reasons, other than statutory, including variations due to turnover, shall be borne by them and (ii) any error of interpretation of applicability of rate of GST (CGST & SGST/ UTGST or IGST) on components of an item and/or various items of tender by them shall be dealt as per clause no. 13.13 of Section-III.	

Sl.	DESCRIPTION	BIDDER'S CONFIRMATION
26.	Bidders confirm to submit signed copy of Integrity Pact (wherever included in tender). If Bidder is a partnership concern or a consortium, this agreement must be signed by all partners or consortium members.	
27.	Bidder confirms that there is no conflict of interest with other bidders, as per clause no.4.2 of Section-III (ITB) of Tender Document.	
28.	Bidder confirms that, in case of contradiction between the confirmations provided in this format and to the terms & conditions mentioned elsewhere in the offer, the confirmations given in this format shall prevail.	

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

F-6

ACKNOWLEDGEMENT CUM CONSENT LETTER

(On receipt of tender document/information regarding the tender, Bidder shall acknowledge the receipt and confirm his intention to bid or reason for non-participation against the enquiry /tender through e-mail to concerned executive in IGGL issued the tender, by filling up the Format)

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)
TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Dear Sir,

We hereby acknowledge receipt of a complete set of bidding document along with enclosures for subject item/job and/or the information regarding the subject tender.

- We intend to bid as requested for the subject item/job and furnish following details with respect to our quoting office:

  Postal Address with Pin Code: .....
  Telephone Number : .....
  Contact Person : .....
  E-mail Address : .....
  Mobile No. : .....
  Date : .....
  Seal/Stamp : .....

- We are unable to bid for the reason given below:

  Reasons for non-submission of bid:

_____

Agency's Name : .....
Signature : .....
Name : .....
Designation : .....
Date : .....
Seal/Stamp : .....

F-7

BIDDER'S EXPERIENCE

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Sl. No	Description of the Services	LOA /WO No. and date	Full Postal Address & phone nos. of Client. *Name, designation and address of Engineer/ Officer-in-Charge (for cases other than purchase)*	Value of Contract/Order (*Specify* Currency Amount)	Date of Commencement of Services	Scheduled Completion Time (Months)	Date of Actual Completion	Reasons for delay in execution, if any
(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal:

Note: As per cl. no. D of Section-II, only documents (Work Order, Completion certificate, Execution Certificate etc.) which have been referred/ specified in the bid shall be considered in reply to queries during evaluation of Bids.

F-8 (A)
CHECK LIST

Bidders are requested to duly fill in the checklist. This checklist gives only certain important items to facilitate the bidder to make sure that the necessary data/information as called for in the bid document has been submitted by them along with their offer. This, however, does not relieve the bidder of his responsibilities to make sure that his offer is otherwise complete in all respects.

Please ensure compliance and tick (√) against following points:

Sl. No.	DESCRIPTION	CHECK BOX	REFERENCE PAGE NO. OF THE BID SUBMITTED
1.0	Digitally Signing (in case of e-bidding)/ Signing and Stamping (in case of manual bidding) on each sheet of offer, original bidding document including SCC, ITB, GCC ,SOR drawings, corrigendum (if any)		
2.0	Confirm that the following details have been submitted in the Un-priced part of the bid		
i	Covering Letter, Letter of Submission		
ii	EMD / Declaration for Bid Security [as applicable] as per provisions of Tender		
iii	Digitally signed (in case of e-tendering) or 'signed & stamped (in case of Manual tender) tender document along with drawings and addendum (if any)		
iv	Power of Attorney in the name of person signing the bid.		
v	Confirm submission of document alongwith unpriced bid as per bid requirement (including cl.no.11.1.1 of Section-III).		
3.0	Confirm that all format duly filled in are enclosed with the bid duly Digitally Signed (in case of e-bidding)/ Signed and Stamped (in case of manual bidding) by authorised person(s)		
4.0	Confirm that the price part as per Price Schedule format submitted with Bidding Document/ uploaded in case of e-bid.		
5.0	Void		
6.0	Confirm that Undertaking as per *Form-2 to Annexure-V to Section-III* and Certification from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of other than companies) as per *Form-3 to Annexure-V to Section-II I*are submitted. (Applicable for all bidders)		

Sl. No.	DESCRIPTION	CHECK BOX	REFERENCE PAGE NO. OF THE BID SUBMITTED
7.0	Confirm that Undertaking as per Form-1to Section-II have been submitted by the bidder (Guidelines from Procurement from a Country sharing a Land Border with India)		
8.0	Confirm submission of Checklist against Bid Evaluation Criteria as per format F-8(B)		

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:

F-8(B)
CHECKLIST FOR BID EVALUATION CRITERIA (BEC) QUALIFYING DOCUMENTS
(refer Section II of Tender document)

BEC Clause No.	Description	Documents required for qualification	Documents Submitted by Bidder	Documents attested as per Section-II of Tender	Reference Page No. of the Bid submitted
Technical BEC					
A.1	Experience as a single bidder	(a) Detailed work order along with Schedule of Rates. (b) Completion certificate issued by end user / Owner (or their consultant who has been duly authorized by owner to issue such certificate) OR Execution certificate (issued by the end user/ owner/authorized consultant) in place of completion certificate for meeting the stipulated experience criteria provided that the asset for which the said execution certificate has been issued is ready for commercial use i.e.; "Completion of Hydro-testing and EGP of the complete scope of work under the contract / work order submitted". **Note:** I. For Completion Certificate: The Completion Certificate shall have details like work order no., date, brief scope of work, executed order value, completion date etc. II. For Execution Certificate: The execution certificate shall have details like work order no., date, brief scope of work, executed order value, date of execution certificate, completion details of Hydrotesting and EGP of the complete scope of work under the contract / work order submitted. In case execution certificate does not have completion details of Hydrotesting and EGP of the complete scope of work under the contract / work order submitted, then, relevant RA Bill along with proof of payment is to be submitted, for Line Item- Electronic Geometric Pigging (EGP) of the complete scope of work under the contract / work order submitted.		Yes/No	

BEC Clause No.	Description	Documents required for qualification	Documents Submitted by Bidder	Documents attested as per Section-II of Tender	Reference Page No. of the Bid submitted
A.2	Equipment Deployment Criteria	**(A) Equipment's (owned) as per Annexure-A to BEC:** 1. The bidder shall submit the certificate from chartered accountant (for ownership / possession of equipment / vehicles) as per format F-20 enclosed in the Bid Document. 2. The submission of Format F-20 is mandatory. 3. "For equipment to be purchased" - Purchase order duly accepted by equipment supplier and with equipment delivery to project site, meeting the equipment deployment schedule. However, contractor to own minimum 50% of the equipment against each type of equipment; balance 50% may be covered under to be purchased "Category". If 50% is a fraction, the same needs to be rounded off to next higher number for the minimum owned category. The purchase order shall be duly signed & stamped by Chartered Accountant / statutory auditor. Date of purchase order shall be before bid due date. 4. The bidder shall submit Certificate from Chartered Engineer certifying that the bidder own equipment is under good health and working condition as per Format F-21 enclosed in the Bid Document.		Yes/No	
Note to A (i)	Jobs executed for Subsidiary / Fellow subsidiary / Holding	Tax paid invoice(s) duly certified by statutory auditor of the bidder towards payments of statutory tax in support of the job executed for Subsidiary / Fellow subsidiary /Holding company.		Yes/No	

BEC Clause No.	Description	Documents required for qualification	Documents Submitted by Bidder	Documents attested as per Section-II of Tender	Reference Page No. of the Bid submitted
	company				
Note to A (ii)	Experience as consortium member/JV member	(c) Same documents as mentioned in A.1 & A.2 above. (d) Consortium Agreement / MOU clearly defining the scope and responsibility. **Note:** The completion certificates shall have details like work order no., date, brief scope of work, completion date, executed order value etc.		Yes/No	
Documents Required-Financial Criteria					
B	BEC (Financial)	A certificate for financial capability of the bidder from Practicing Chartered Accountant in prescribed format [Format F-10] as provided in the Tender Document.	Submitted (*Mention specific year……*)	Yes/No	
B.1	Average Annual Turn-over	Bidder(s) shall submit copy of Audited Annual Financial Statement [Balance Sheet and Profit & Loss Account Statement] along with Audit Report of three (3) preceding Financial Year(s) along with un-price bid.	Submitted (M*ention specific year ……..*)	Yes/No	
B.2	Net Worth	Bidder(s) shall submit copy of Audited Annual Financial Statement [Balance Sheet and Profit & Loss Account Statement] along with Audit Report of last Financial Year along with un-price bid.	Submitted (*Mention specific year……*) Submitted/ Not Applicable *(Bidder to tick appropriate*	Yes/No	

BEC Clause No.	Description	Documents required for qualification	Documents Submitted by Bidder	Documents attested as per Section-II of Tender	Reference Page No. of the Bid submitted
			option)		
B.3	Working Capital	Bidder(s) shall submit copy of Audited Annual Financial Statement [Balance Sheet and Profit & Loss Account Statement] alongwith Audit Report for the last audited Financial Year along with un-price bid. Note: If the bidder's working capital is negative or inadequate, the bidder shall submit a letter from their bank having net worth not less than Rs.100 crores (or equivalent in USD), confirming the availability of line of credit for working capital amount, irrespective of overall position of the working capital, mentioned herein above. The line of credit letter from bank to be submitted strictly as per format at F-9. Declaration Letter/Certificate for line of credit due to shortfall of working capital shall be from single bank only. Letters from multiple banks shall not be applicable. However, banking syndicate will also be acceptable wherein a group of banks can jointly provide line of credit to the bidder. The bank shall be required to issue the letter for declaration/ certificate of line of credit on their letter head along with the contact details of the issuing authority like email id, contact number etc. **The original document for "Line of Credit" should be submitted along with other physical documents required as per terms and conditions of tender.**	Submitted		

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Seal

F-9

FORMAT FOR CERTIFICATE FROM BANK IF BIDDER'S WORKING CAPITAL IS INADEQUATE/NEGATIVE

(To be provided on Bank's letter head)

Date:

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

Dear Sir,

This is to certify that M/s …….. (name of the Bidder with address) (hereinafter referred to as Customer) is an existing Customer of our Bank.

The Customer has informed that they wish to bid for IGGL's Tender No. ..... dated …… for ……..(Name of the supply/work/services/consultancy) and as per the terms of the said Tender Document they have to furnish a certificate from their Bank confirming the availability of line of credit.

Accordingly M/s …….. (name of the Bank with address) confirms availability of line of credit to M/s …….. (name of the Bidder) for at least an amount of Rs. _____

It is also confirmed that the net worth of the Bank is more than Rs. 100 Crores (or Equivalent USD) and the undersigned is authorized to issue this certificate.

Yours truly

for …… (Name & address of Bank)

(Authorized signatory)
Name of the signatory:
Designation :
Email Id :
Contact No. :
Stamp

Note:
This Declaration Letter for line of credit shall be from single bank only. Letters from multiple banks shall not be applicable. However, banking syndicate will be acceptable wherein a group of banks can jointly provide line of credit to the bidder.

F-10

FORMAT FOR CHARTERED ACCOUNTANT CERTIFICATE/ CERTIFIED PUBLIC ACCOUNTANT (CPA) FOR FINANCIAL CAPABILITY OF THE BIDDER

We have verified the Audited Financial Statements and other relevant records of M/s…… (Name of the bidder) and certify the following:

A. AUDITED ANNUAL TURNOVER* OF LAST 3 YEARS:

Year	Amount (Currency)
Year 1:	
Year 2:	
Year 3:	
Total (A)	
Average Annual Financial Turnover during the last three financial years (A/3)	

B. NETWORTH* AS PER LAST AUDITED FINANCIAL STATEMENT:

Description	**Year _____**
	Amount (Currency)
1. Net Worth	

C. WORKING CAPITAL* AS PER LAST AUDITED FINANCIAL STATEMENT :

Description	**Year _____**
	Amount (Currency)
1. Current Assets	
2. Current Liabilities	
3. Working Capital (Current Assets-Current liabilities)	

Refer Instructions

Note:

1.0 It is further certified that the above mentioned applicable figures are matching with the returns filed with Registrar of Companies (ROC) [Applicable only in case of Indian Companies]

2.0 We confirm that above figures are after referring instructions at page 2 of 2 of F-10.

3.0 Practicing Chartered Accountants shall generate Unique Document Identification Number (UDIN) for all certificates issued by them

Name of Audit Firm:
Chartered Accountant/CPA
Date:

Membership No.:

[Signature of Authorized Signatory]
Name:
Designation:
Seal:
UDIN:

(Page 1 of 2)

Instructions:

1. The Separate Pro-forma shall be used for each member in case of JV/ Consortium.

2. The financial year would be the same as one normally followed by the bidder for its Annual Report.

3. The bidder shall provide the audited annual financial statements as required for this Tender document. Failure to do so would result in the Proposal being considered as non-responsive.

4. For the purpose of this Tender document:

   (i) **Annual Turnover** shall be "Revenue from Operations" as per Profit & Loss account of audited annual financial statements
   (ii) **Working Capital** shall be "Current Assets less Current liabilities" and
   (iii) **Net Worth** shall be Aggregate value of the paid-up share capital and all reserves created out of the profits and securities premium amount, after deducting the aggregate value of the accumulated losses, deferred expenditure and miscellaneous expenditure not written off, if any, but does not include reserves created out of revaluation of assets, write-back of depreciation and amalgamation.

   In case the date of constitution/incorporation of the bidder is less than 3 years old, the average turnover in respect of the completed financial years after the date of constitution/ incorporation shall be taken into account for minimum Average Annual Financial Turnover criteria.

5. **Above figures shall be calculated after considering the qualification, if any, made by the statutory auditor on the audited financial statements of the bidder including quantified financial implication.**

6. This certificate is to be submitted on the letter head of Chartered Accountant/CPA.

(Page 2 of 2)

F-11
FORMAT FOR CONSORTIUM AGREEMENT
(ON NON- JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

CONSORTIUM/JV AGREEMENT

VOID

F-12

BIDDER'S QUERIES FOR PRE BID MEETING

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Sl. No.	REFERENCE OF BIDDING DOCUMENT				BIDDER'S QUERY	IGGL 'S REPLY
	SEC. No.	Page No.	Clause No.	Subject		

NOTE: The Pre-Bid Queries may be sent by e-mail before due date for receipt of Bidder's queries.

SIGNATURE OF BIDDER: _____

NAME OF BIDDER : _____

F-13

E-Banking Mandate Form

(To be issued on vendors letter head)

1. Vendor/customer Name :

2. Vendor/customer Code:

3. Vendor /customer Address:

4. Vendor/customer e-mail id:

5. Particulars of bank account
   a) Name of Bank
   b) Name of branch
   c) Branch code:
   d) Address:
   e) Telephone number:
   f) Type of account (current/saving etc.)
   g) Account Number:
   h) RTGS IFSC code of the bank branch
   i) NEFT IFSC code of the bank branch
   j) 9 digit MICR code

I/We hereby authorize Indradhanush Gas Grid Limited to release any amount due to me/us in the bank account as mentioned above. I/We hereby declare that the particulars given above are correct and complete. If the transaction is delayed or lost because of incomplete or incorrect information, we would not hold the Indradhanush Gas Grid Limited responsible.

(Signature of vendor/customer)

BANK CERTIFICATE

We certify that ---------- has an Account no. ---------- with us and we confirm that the details given above are correct as per our records.
Bank stamp

Date (Signature of authorized officer of bank)

F-14

INTEGRITY PACT

INTEGRITY PACT

(IP signed by IGGL's executive shall be made part of tender document)

राजा साहब उद्दीन अहमद
Raja Sahab Uddin Ahmed
महाप्रबंधक (भं एवं पि)
General Manager (C&P)
आई जि जि एल/IGGL, Guwahati-5

INTEGRITY PACT

INTRODUCTION:

IGGL as one of its endeavour to maintain and foster most ethical and corruption free business environment, have decided to adopt the Integrity Pact, a tool developed by the Transparency International, to ensure that all activities and transactions between the Company (IGGL) and its Counter parties (Bidders, Contractors, Vendors, Suppliers, Service Providers/Consultants etc.) are handled in a fair and transparent manner, completely free of corruption.

Considering the above, the details mentioned at attached Annexure-1 are applicable as stated in Instruction to Bidders of Bid Document in addition to the existing stipulation regarding Corrupt and Fraudulent Practices.

The attached copy of the Integrity Pact at Annexure-2 shall be included in the Bid submitted by the bidder (to be executed by the bidder for all tenders of value Rs. 1 (One) crore and above). In case a bidder does not sign the Integrity Pact, his bid shall be liable for rejection.

राजा साहब उद्दीन अहमद
Raja Sahab Uddin Ahmed
महाप्रबंधक (कॉ एवं पि)
General Manager (C&P)
आई जि लि एल/IGGL, Guwahati-5

ANNEXURE-1

Bidder is required to sign the Integrity Pact with IGGL as per format & terms and conditions enclosed with tender. In case a bidder does not sign the Integrity Pact, his bid shall be liable for rejection.

I COMMITMENTS AND OBLIGATIONS OF THE "COUNTER PARTY"

a) The Counter party, directly or indirectly (through agent, consultant, advisor, etc.), shall not pay any bribe/ influence or give undue/ unlawful benefit to anyone to gain undue advantage in dealing with IGGL.

b) The Counter party will not engage in collusion of any kind including price fixation etc. with other Counter parts.

c) The counter party will not pass IGGL's confidential information to any third party unless specifically authorized by IGGL in writing.

d) The Counterparties shall promote and observe best ethical practices within the irrespective organizations.

e) The Counter party shall inform the Independent External Monitor.

i) If it received any demand, directly or indirectly, for a bribe/ favour or any illegal gratification/payment/benefit;
ii) If it comes to know of any unethical or illegal payment/benefit;
iii)If it makes any payment to any IGGL associate.

f) The Counter party shall not make any false or misleading allegations against IGGL or its associates.

II VIOLATIONS & CONSEQUENCES:

a) If a Counterparty commits a violation of its Commitments and Obligations under the Integrity Pact Programme during bidding process, their entire Earnest Money Deposit/ Bid Security, would be forfeited and in addition, action shall be taken as per **"Procedure for action in case Corrupt /Fraudulent/ Collusive/Coercive Practices"**

b) In case of violation of the Integrity pact by Counterparty after award of the Contract, IGGL shall be entitled to terminate the Contract. Further, IGGL would forfeit the security deposits/ Contract Performance Bank Guarantee and in addition, action shall be taken as per **"Procedure for action in case Corrupt/Fraudulent/Collusive/Coercive Practices"**

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Raja Sahab Uddin Ahmed
महाप्रबंधक (सी एन्ड पि)
General Manager (C&P)
आई जि जि एल/IGGL, Guwahati-5

INDEPENDENT EXTRNAL MONITORS (IEMS)

Presently the panel consisting of the following Independent External Monitors (IEMs) has been appointed by IGGL, in terms of Integrity Pact (IP) which forms part of IGGL Tenders / Contracts.

(i) **Smt. Madhu Sharma, IFOS (Retd.)**
(E-mail Id: madhu1sharma@yahoo.com)

(ii) **Shri Shyam Nandan Prasad, Director-Marketing, Coal India Ltd. (Retd.)**
(E-mail: shyamnandanprasad@yahoo.com)

This panel is authorized to examine / consider all references made to it under this tender/ contract. The bidder(s), in case of any dispute(s) / complaint(s) pertaining to this tender may raise the issue either with the designated tender/contract issuing officer or Nodal Officer (presently Shri Raja Sahab Uddin Ahmed) in IGGL or directly with the IEMs on the panel or IEM c/o Chief Vigilance Officer.

राजा साहब उद्दीन अहमद
Raja Sahab Uddin Ahmed
महाप्रबंधक (भं एवं वि)
General Manager (C&P)
आई जि जि एल/IGGL, Guwahati-5

ANNEXURE-2

INTEGRITY PACT

(To be executed on plain paper)

Between Indradhanush Gas Grid Limited (IGGL), a JV of ONGC, OIL, GAIL, NRL, & IOCL , (here-in-after referred to as "Principal").

AND

_____(here-in-after referred to as "The Bidder/Contractor").

(Principal and the Bidder / Contractor are here-in-after are referred to individually as "Party" or collectively as "Parties").

PREAMBLE

The Principal intends to award under laid down organizational procedures, contract/s for _____.The Principal values full compliance with all relevant laws of land rules, regulations, and economic use of resources and of fairness/transparency in its relations with its Bidder(s) and/or Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitors (IEMs) who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 –Commitments of the Principal

1. The Principal commits itself to take all measures necessary to prevent corruption and to observe the following Principles:-

   i) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or for a third person, any material or in material benefit which the person is not legally entitled to.

   ii) The Principal will, during the tender process treat all Bidder(s) with equity and reasons. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder (s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

   iii) The Principal will exclude from the process all known prejudiced persons.

2. If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal Code (IPC)/ Prevention of Corruption Act (PC

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आई जि लि एलIGGL, Guwahati-5

Act), or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officers and in addition can initiate disciplinary actions.

Section 2–Commitments of the Bidder(s)/Contractor(s)

1. The Bidder(s) / Contractor(s) commit themselves to take all measures necessary to prevent corruption. The Bidder(s)/ Contractor(s) commits themselves to observe the following principles during participation in the tender process and during the contract execution:

   i) The Bidder (s) / Contractor (s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

   ii) The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other action to restrict competitiveness or to introduce cartelization in the bidding process.

   iii) The Bidder (s) / Contractor (s) will not commit any offence under the relevant IPC/PC Act; further, the Bidder (s) / Contractor (s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

   iv) The Bidder (s)/ Contractor (s) of foreign origin shall disclose the name and address of the Agents/ representatives in India, if any. Similarly, the Bidder (s)/Contractor (s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further, all the payments made to the Indian agent/representative have to be in Indian Rupees only.

   v) The Bidder (s) / Contractor (s) will, when presenting their bid, disclose any and all payments made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

   vi) Bidder(s) / Contractor(s) who have signed the Integrity Pact shall not approach the Courts while representing the matter to IEMs and shall wait for their decision in the matter.

2. The Bidder(s)/ Contractor(s) shall not instigate third person to commit offences outlined above or be an accessory to such offences.

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आई जि एल/IGGL, Guwahati-5

Section 3 –Disqualification from tender process and exclusion from future contracts

If the Bidder (s) / Contractor (s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put their reliability or credibility in question, the Principal is entitled to disqualify the Bidder (s) / Contractor (s) from the tender process or take action as per provisions of **"Procedure for action in case Corrupt/Fraudulent/Collusive/Coercive Practices".**

Section 4 –Compensation for Damages

1. If the Principal has disqualified the Bidder (s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

2. If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equal to the Contract Value or the amount equivalent to Performance Bank Guarantee.

Section 5–Previous transgression

1. The Bidder declares that no previous transgression occurred in the last three years, with any other Company in any country conforming to the anti-corruption approach or with any Public Sector Enterprise in India that could justify his exclusion from the tender process.

2. If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or actions can be taken as per provisions of **"Procedure for action incase Corrupt/Fraudulent/ Collusive/Coercive Practices"**

Section 6 –Equal treatment to all Bidders/ Contractors/Subcontractors

1. In case of sub-contracting, the Principal contractor shall take the responsibility of the adoption of IP by the sub-contractor. It is to be ensured by him that all sub-contractors also sign the IP.

2. The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

3. The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

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आई ओ सि एल/IOCL, Guwahati-5

Section 7–Criminal charges against violating Bidder(s)/Contractor (s)/Sub-contractor(s)

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 8–Independent External Monitor/Monitors

1. The Principal appoints competent and credible Independent External Monitor for this Pact after approval by Central Vigilance Commission. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

2. The Monitor is not subject to instructions by the representatives of the parties and performs his/her functions neutrally and independently. The Monitor would have access to all documents/records pertaining to the contract for which a complaint or issue is raised before them, as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed. It will be obligatory for him/ her to treat the information and documents of the Bidders/Contractors as confidential. He/she reports to the CEO, IGGL.

3. The Bidder (s)/ Contractor (s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his/her request and demonstration of a valid interest, unrestricted and unconditional access to their project documentation. The same is applicable to Sub-contractors.

5. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

6. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he/she will so inform the Management of the Principal and request the Management to discontinue or to take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

7. The Monitor will submit a written report to the CEO, IGGL within 30 days from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.

8. If the Monitor has reported to the CEO, IGGL, a substantiated suspicion of an offence under relevant IPC/PC Act, and the CEO, IGGL has not, within reasonable time, taken

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आई जि जि एल/IGGL, Guwahati-8

visible action to proceed against such offence or reported it to the Chief Vigilance Officer, then only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Central Vigilance Commission.

9. The word 'Monitor' would include both singular and plural.

10. In case of any complaints referred under IP Program, the role of IEMs is advisory and would not be legally binding and it is restricted to resolving the issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidder.

11. After award of contract, the IEMs shall look into any issue relating to execution of contract, if specifically raised before them. As an illustrative example, if a contractor, who has been awarded the contract, during the execution of contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs.

Section 9–Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract, and for all other Bidders 6 months after the contract has been awarded. Any violation to the same would entail disqualification of the bidders and exclusion from future business dealing.

If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by the CEO, IGGL.

Section 10–Miscelleneous provisions

1. This agreement is subject to Indian Law. Place of performance and exclusive jurisdiction is the Registered Office of the principal, i.e. Guwahati.

2. Changes and supplements as well as termination notices, if any, need to be made in writing. Side agreements have not been made.

3. If the Contractor / Bidder is a Joint Venture or a partnership concern or a consortium, this agreement must be signed by all partners or consortium members.

4. Should one or several of the provisions of this agreement turn out to be invalid, the remainder of this agreement shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions in such a case.

5. Issues like warranty/guarantee, etc. shall be outside the purview of IEMs.

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Raja Sahab Uddin Ahmed
महाप्रबंधक (भंडार एवं क्रय)
General Manager (C&P)
आई जि लि एल/IGGL, Guwahati-5

6. In the event of any contradiction between the Integrity Pact and its Annexure, the Clause in Integrity Pact will prevail.

----------	----------
(For & on Behalf of Principal)	(For & on Behalf of Bidder/ Contractor)
(Office Seal)	(Office Seal)

Place.....
Date .....

Witness1:
(Name & Address) .....
.....
.....

Witness2:
(Name & Address) .....
.....
.....

राजा साहब उद्दीन अहमद
Raja Sahab Uddin Ahmed
महाप्रबंधक (भं एवं पि)
General Manager (C&P)
आई जि नि एल/IGGL, Guwahati-5

F-15
INDEMNITY BOND

WHEREAS Indradhanush Gas Grid Limited (hereinafter referred to as "**IGGL**") which expression shall, unless repugnant to the context include itssuccessors and assigns, having its registered office at 7th Floor, NRL Centre , G.S. Road, Christian Basti ,Guwahati , Assam – 781005 has entered into a contract with M/s*……. (hereinafter referred to as the "**Contractor"**) which expression shall unless repugnant to the context include its representatives, successors and assigns, having its registered office at *…….. and on the terms and conditions as set out, inter-alia in the [*mention the work order/LOA/Tender No*.]and various documents forming part thereof, hereinafter collectively referred to as the '**CONTRACT'** which expression shall include all amendments, modifications and / or variations thereto.

IGGL has also advised the Contractor to execute an Indemnity Bond in general in favour of IGGL indemnifying IGGL and its employees and Directors including Independent Directors from all consequences which may arise out of any prospective litigation or proceedings filed or may be initiated by any third party, including any Banker / financial institution / worker(s) /vendor(s)/ subcontractor(s) etc. who may have been associated or engaged by the Contractor directly or indirectly with or without consent of IGGL for above works.

NOW, THEREFORE, in consideration of the promises aforesaid, the Contractor hereby irrevocably and unconditionally undertakes to indemnify and keep indemnified IGGL and all its employees, Directors, including Independent Directors, from and against all/any claim(s), damages, loss, which may arise out of any litigations/ liabilities that may be raised by the Contractor or any third party against IGGL under or in relation to this contract. The Contractor undertakes to compensate and pay to IGGL and/or any of its employees, Directors including Independent Directors, forth with on demand without any protest the amount claimed by IGGL for itself and for and on behalf of its employees, Directors including Independent Directors together with direct/indirect expenses including all legal expenses incurred by them or any of them on account of such litigation or proceedings.

AND THE CONTRACTOR hereby further agrees with IGGL that:

(i) This Indemnity shall remain valid and irrevocable for all claims of IGGL and/or any of its employees and Directors including Independent Directors arising out of said contract with respect to any such litigation / court case for which IGGL and/or its employees and Directors including Independent Directors has been made party until now or here-in-after.

(ii) This Indemnity shall not be discharged/revoked by any change/ modification/amendment/assignment of the contract or any merger of the Contractor with other entity or any change in the constitution/structure of the Contractor's firm/Company or any conditions thereof including insolvency etc. of the Contractor, but shall be in all respects and for all purposes binding and operative until any/all claims for payment of IGGL are settled by the

---

Contractor and/or IGGL discharges the Contractor in writing from this Indemnity.

The undersigned has full power to execute this Indemnity Bond for and on behalf of the Contractor and the same stands valid.

SIGNED BY :

For *[Contractor]*

Authorised Representative

Place:

Dated:

Witnesses:
1.
2

F-15A

PROFORMA OF INDEMNITY BOND FOR SUPPLY OF MATERIALS BY EMPLOYER

(To be executed on non-judicial stamped paper of appropriate value)

WHEREAS IGGL. (hereinafter referred to as IGGL) which expression shall unless repugnant to the context includes their legal representatives, successors and assigns having their office at 5th floor, Central Mall, Christian Basti, Guwahati,Assam has entered into a CONTRACT with

_____

(hereinafter referred to as the CONTRACTOR which expression shall unless repugnant to the context include their legal representatives, successors and assigns) for _____

_____

on the terms and conditions as setout, inter-alia, in the CONTRACT No..... Dated..... and various documents forming part thereof hereinafter collectively referred to as the "CONTRACT" which expression shall include all amendments, modifications and/or variations thereto.

AND WHEREAS

i) IGGL has agreed to supply to the CONTRACTOR, equipment, plants and materials (finished, semi-finished and raw) for the purpose of EXECUTION of the said CONTRACT by the CONTRACTOR (the equipment, plants and materials to be supplied by IGGL to the CONTRACTOR, hereinafter for the sake of brevity referred to as the "said materials") and pending execution by the CONTRACTOR of the CONTRACT incorporating the said materials, the said materials shall be under the custody and charge of the CONTRACTOR and shall be kept, stored, altered, worked upon and/or fabricated at the sole risk and expense of the CONTRACTOR.

ii) As a pre-condition to the supply of the said materials by IGGL to the CONTRACTOR, IGGL has required the CONTRACTOR to furnish to IGGL an Indemnity Bond in the manner and upon terms and conditions hereinafter indicated.

NOW, THEREFORE, in consideration of the premises aforesaid the CONTRACTOR hereby irrevocably and unconditionally undertakes to indemnify and keep indemnified IGGL from and against all loss, damage and destruction (inclusive but not limited to any or all loss or damage or destruction to or of the said materials or any item or part thereof by theft, pilferage, fire, flood, storm, tempest, lightning, explosion, storage, chemical or physical action or reaction, binding, warping, exposure, rusting, faulty workmanship, faulty fabrication, or faulty method or technique

of fabrication, strike, riot, civil commotion, or other actor omission or commission whatsoever within or beyond the control of the CONTRACTOR, misuse and misappropriation (inclusive but not limited to the misuse or misappropriation by the CONTRACTOR and the Contractor's servants and/or agents) whatsoever to, or of in the said materials or any part of them thereof from the date that the same or relative part of item thereof was supplied to the CONTRACTOR upto and until the date of return to IGGL of the said materials or relative part of item thereof or completed fabricated works(s) incorporating the said material and undertake to pay to IGGL forthwith on demand in writing without protest or demur the value as specified by IGGL of the said material or item or part thereof, lost, damaged, destroyed, misused and/or misappropriated, as the case may be or, together with IGGL'S costs and expenses (inclusive of but not limited to handling, transportation, cartage, insurance, freight, packing and inspection costs/or expenses upto) and aggregate limit of Rs. _____

(Rupees_____Only).

AND THE CONTRACTOR hereby agrees with IGGL that:

i) This Indemnity/Undertaking shall be a continuing Indemnity/ Undertaking and shall remain valid and irrevocable for all claims of IGGL arising hereunder upto and until the midnight of_____. However, if the CONTRACT for which this Indemnity/Undertaking is given is not completed by this date, the CONTRACTOR hereby agrees to extend the Indemnity/Undertaking till such time as is required to fulfil the CONTRACT.

ii) This Indemnity/Undertaking shall not be determined by any change in constitution or upon insolvency of the CONTRACTOR but shall be in all respects and for all purposes be binding and operative until payment of all moneys payable to IGGL in terms of hereof.

iii) The mere statement of allegation made by or on behalf of IGGL in any notice or demand or other writing addressed to the CONTRACTOR as to any of the said material or item or part thereof having been lost , damaged, destroyed, misused or misappropriated while in the custody of the CONTRACTOR and/or prior to completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials shall be conclusive of the factum of the said material or item or part thereof having been supplied to the CONTRACTOR and/or the loss, damage, destruction, misuse or misappropriation thereof, as the case may be, while in the custody of the CONTRACTOR and/or prior to the completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials without necessity on the part of IGGL to produce any documentary proof or other

evidence whatsoever in support of this.

iv) The amount stated in any notice of demand addressed by IGGL to the CONTRACTOR as to the value of such said materials lost, damaged, destroyed, misused or misappropriated, inclusive relative to the costs and expenses incurred by IGGL in connection therewith shall be conclusive of the value of such said materials and the said cost and expenses as also of the amount liable to be paid to IGGL to produce any voucher, bill or other documentation or evidence whatsoever in support thereof and such amount shall be paid without any demur and on demand and no dispute shall be raised concerning the same.

The undersigned has full power to execute this Indemnity Bond on behalf of the CONTRACTOR under the Power of Attorney dated _____.

(SIGNED BY COMPETENT AUTHORITY)

Place:

Dated:

Official seal of the CONTRACTOR

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FREQUENTLY ASKED QUESTIONS (FAQs)

SL.NO.	QUESTION	ANSWER
1.0	Can any vendor quote for subject Tender?	Yes. A Vendor has to meet Bid Evaluation Criteria given under Section II of Tender document in addition to other requirements.
2.0	Should the Bid Evaluation Criteria documents be attested?	Yes. Please refer Section II of Tender document
3.0	Is attending Pre Bid Meeting mandatory.	No. Refer Clause No. 17 of Instruction to Bidders of Tender Document. However attending Pre Bid Meeting is recommended to sort out any issue before submission of bid by a Bidder.
4.0	Can a vendor submit more than 1 offer?	No. Please refer Clause No. 4 of Instruction to Bidders of Tender Document.
5.0	Is there any Help document available for e-Tender.	Refer FAQs as available on Govt. e-Procurement System of National Informatics Center (NIC) https://etenders.gov.in/eprocure/app
6.0	Are there are any MSE (Micro & Small Enterprises) benefits available?	Yes. Refer Clause No. 40 of Instructions to Bidders of Tender Document.
7.0	Are there are any benefits available to Startups?	Refer Clause No. 49 of Instructions to Bidders of Tender Document.

All the terms and conditions of Tender remain unaltered.

F-17

UNDERTAKING REGARDING SUBMISSION OF ELECTRONIC INVOICE (E-INVOICE AS PER GST LAWS)

(to be submitted on letter head along with documents for release of payment)

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

PO NO:

Dear Sir,

We _____ (Name of the Supplier) hereby confirm that E-Invoice provision as per the GST Law is

(i) Applicable to us [ ]

(ii) Not Applicable to us [ ]

(Supplier is to tick appropriate option [✓]above).

In case, same is applicable to us, we confirm that we will submit E-Invoice after complying with all the requirements of GST Laws. If the invoice issued without following this process, such invoice can-not be processed for payment by IGGL as no ITC is allowed on such invoices. We also confirm that If input tax credit is not available to IGGL for any reason attributable to Supplier (both for E-invoicing cases and non-E-invoicing cases), then IGGL shall not be obligated or liable to pay or reimburse GST (CGST & SGST/UTGST or IGST) claimed in the invoice(s) and shall be entitled to deduct / setoff / recover such GST amount (CGST & SGST/UTGST or IGST) or Input Tax Credit amount together with penalties and interest, if any, by adjusting against any amounts paid or becomes payable in future to the Supplier under this contract or under any other contract.

Place: [Signature of Authorized Signatory of Bidder]
Date: Name:
Designation:
Seal:

F-18

NO CLAIM CERTIFICATE
(TO BE SUBMITTED BEFORE RELEASE OF CPS/SECURITY DEPOSIT)

[On the Letter-head of Supplier/Vendor]

We, _____, a company incorporated under the laws of India/ a Consortium between *___ and *____ (*name of Consortium partners to be inserted*)/ a Partnership Firm consisting of *___ and *___ (*name of Partners to be inserted*)/ a Sole Proprietorship (as the case may be), having its registered office at _____ and carrying on business under the name and style M/s. _____ were awarded the contract by Indradhanush Gas Grid Limited in reference to Tender No. _____ dated _____ ("Order/Contract").

After completion of the above-said items/job under the Order/Contract, we have scrutinized all our claims, contentions, disputes, issues and we hereby confirm that after adjusting all payments received by us against our R.A. Bills and final bill, we have no claims, dues, issues and contentions from Indradhanush Gas Grid Limited.

We further absolve Indradhanush Gas Grid Limited from all liabilities present or future arising directly or indirectly out of the Contract.

There is no economic duress or any other compulsion on us for submission of this no claim certificate.

Signature with Seal of Supplier/Vendor

Dated:

Format F-19
POWER OF ATTORNEY
(to be submitted on the letter-head of company)

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Name of Bidder:_____

"The undersigned _____(Name of LEGAL PERSON*) is lawfully authorized to represent and act on behalf of the company M/s _____ (Name of bidder) whose registered address is _____ and does hereby appoint Mr./Ms _____ [name of authorized person/(s)] _____ (Designation) of M/s _____ (Name of bidder) whose signature appears below to be the true and lawful attorney/(s) and authorize him/her to sign the bid (**both digitally and manually**)**and all subsequent communications, agreements, documents etc.**, in the name and on behalf of the company in connection with the tender no. _____ for……(Name of work).

The signature of the authorized person/(s) herein constitutes unconditional obligations of M/s _____ (Name of bidder).

This Power of Attorney shall remain valid and in full force and effect before we withdrawal it in writing (by fax, or mail or post). All the documents signed (within the period of validity of the Power of Attorney) by the authorized person/(s) herein shall not be invalid because of such withdrawal.

SIGNATURE OF THE LEGAL PERSON

_____

(Name of person with Company seal)

SIGNATURE OF THE AUTHORIZED PERSON/(S)

_____

(**Name of person**)

E-mail id: ……

Digital token no. used for uploading the bid: ……..

(*)In case of a Single Bidder, Power of Attorney issued by the Board of Directors/ CEO / MD / Company Secretary of the Bidder/ all partners in case of Partnership firm/Proprietor (for Proprietorship firm) in favour of the authorized employee(s) of the Bidder, in respect of the particular tender for signing the Bid and all subsequent communications, agreements, documents etc. pertaining to the tender and to act and take any and all decision on behalf of the Bidder, is to be submitted.

F-20

FROMAT FOR CERTIFICATE BY CHARTERED ACOUNTANT FOR OWNED EQUIPMENT

Project Name: ---------- Pipeline Project **Date: DD.MM.YYYY**

To whom-so-ever it may concern

This is to certify that M/s. **(Bidder's Name)**, having their registered office at **(Bidder's Address)**, is the owner of the equipment mentioned below (or in the attachment) as per our inspection of records / books of accounts / documents of M/s. **(Bidder's Name)** on **(Date)**.

S. No.	Equipment	Make / Model	Capacity	Qty.	Year of Manufacture	Present Location of Equipment

Further, this equipment will be deployed for **(Project Name)** in case M/s. **(Bidder's Name)** is awarded with the job.

(Signature of Chartered Accountant / Statutory Auditor)

Place: ---------
Membership No. of CE: -------
Date: DD.MM.YYYY
Firm Registration No.: -------

Note: The above certificate shall be issued in the letter head of Chartered Accountant / Statutory Auditor.

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FORMAT FOR CERTIFICATE BY CHARTERED ENGINEER FOR OWNED EQUIPMENT:

Project Name:---------- Pipeline Project **Date: DD.MM.YYYY**

To whom-so-ever it may concern

During our visit to various storage yards and project sites of M/s. **(Bidder's Name)**, from **(Date)** to **(Date)**, we have inspected the condition of equipment mentioned below (or in attachment).

We certify that the below mentioned equipment are in good health and working condition presently. Further, these equipment are fit be deployed in **Project Name**.

S. No.	Equipment	Make / Model	Capacity	Qty.	Year of Manufacture	Present Location of Equipment

(Signature of Chartered Engineer)

Place: ---------
Membership No. of CE: -------
Date: DD.MM.YYYY
Firm Registration No.: -------

Note: The above certificate shall be issued in the letter head of Chartered Engineer.

F-22
COMPLETION CERTIFCATE
ON LETTER HEAD

Ref.: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx Date: DD.MM.YYYY

COMPLETION CERTIFICATE

Name of Work	:	
Name of Contractor	:	
Length & Size of Pipeline & Scope of work	:	
Fax of Acceptance No.	:	
Letter of Award No. / Work Order No.	:	
Contractual Value	:	
Final Completion Value	:	DD.MM.YYYY
Contractual Start Date	:	DD.MM.YYYY

Contractual Completion Date

(a) Mechanical Completion	:	DD.MM.YYYY
(b) Overall Completion	:	DD.MM.YYYY

Actual Completion Date

(a) Mechanical Completion	:	DD.MM.YYYY
(b) Overall Completion	:	DD.MM.YYYY
Extension of Time granted without levy of PRS	:	Up to DD.MM.YYYY
Defect Liability Period	:	Up to DD.MM.YYYY

Certified that all the works under the subject Contract have been completed as per contractual terms & conditions, specifications, drawings and approved deviations etc. to the satisfaction of Engineer-In-Charge.

(xxxxxxxxxxxx)
Engineer – In – Charge

Note : Format of Completion Certificate to be issued upon successful completion of work.

F-23

PROFORMA OF BANK GUARANTEE FOR MOBILISATION ADVANCE

(ON NON-JUDICIAL PAPER OF APPROPRIATE VALUE)

Ref.....

Bank Guarantee No. ---------

Date.....

M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

In consideration of the Indradhanush Gas Grid Limited, hereinafter called the "Owner" which expression shall unless repugnant to the context or meaning thereof include its successors, executors, administrators and assignees, having awarded to M/s..... having its registered office at ..... hereinafter referred as the 'CONTRACTOR', which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assignees, a contract hereinafter referred to as the 'Contract' for related works..... referred to as the 'WORK' on terms and conditions set out, inter-alia in the Owner's Contract No.....dated..... valued at..... (in words & figures) and as the Owner having agreed to make an advance payment (herein referred as Mobilization advance) for the performance of the above contract to the CONTRACTOR amounting to.....(in words & figures) as an advance against Bank Guarantee to be furnished by the CONTRACTOR.

We..... hereinafter referred to as the BANK which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assignees having our office at..... do hereby undertake to give the irrevocable and unconditional guarantee and do hereby undertake to pay the OWNER on first demand without any demur, reservation, contest, recourse, protest and without reference to the CONTRACTOR any and all monies payable by the CONTRACTOR by reason of any breach by the said CONTRACTOR of any of the terms and conditions of the said Contract to the extent of..... till the said advance is adjusted as aforesaid at any time upto..... We agree that the guarantee herein contained shall continue to be enforceable till the sum due to the Owner on account of the said advance is adjusted /recovered in full as aforesaid or till the Owner discharges this guarantee in writing.

The OWNER shall have the fullest liberty without affecting in any way the liability of the BANK under this guarantee, from time to time to vary the advance or to extend the time for performance of the works by the CONTRACTOR. The BANK shall not be released from its liability under these presents by any exercise of the Owner of the liberty with reference to the matter aforesaid.

The Owner shall have the fullest liberty, without reference to CONTRACTOR and without affecting this guarantee to postpone for any time or from time to time the exercise of any powers vested in them or of any right which they might have against the CONTRACTOR, and to exercise the same at any time in any manner, and either to enforce or to forebear to enforce any power, covenants contained or implied in the Contract between the OWNER and the CONTRACTOR or any other course or remedy or security available to the OWNER and the BANK shall not be released of its obligations under these presents by any exercise by the OWNER of its liberty with reference to matters aforesaid or other acts of omission or commission on the part of the OWNER or any other law would, but for this provision, have the effect of releasing the

---

BANK.

The right of the OWNER to recover the outstanding sum of advance upto Rs..... from the BANK in the manner aforesaid is absolute and unequivocal and will not be affected or suspended by reason of the fact that any dispute or disputes has or have been raised by the CONTRACTOR and/or that any dispute or disputes is or are pending before any officer, tribunal or court or arbitrator or any other authority / forum and any demand made by OWNER on the BANK shall be conclusive and binding.

The BANK further undertakes not to revoke this guarantee during its currency without previous consent of the OWNER and further agrees that the guarantee contained shall continue to be enforceable until it is discharged by IGGL in writing.

The BANK also agrees that the OWNER shall at its option be entitled to enforce this guarantee against the BANK as a principal debtor, in the first instance, notwithstanding any other security or guarantee that OWNER may have in relation to the CONTRACTOR's liabilities towards the said advance.

The amount under the Bank Guarantee is payable forthwith without any delay by Bank upon the written demand raised by IGGL. Any dispute arising out of or in relation to the said Bank Guarantee shall be subject to the exclusive jurisdiction of courts at Guwahati, Assam, India.

Therefore, we hereby affirm that we are guarantors and responsible to you on behalf of the Contractor up to a total amount of (amount of guarantees in words and figures) and we undertake to pay you, upon your first written demand declaring the Contractor to be in default under the contract and without caveat or argument, any sum or sums within the limits of (amount of guarantee) as aforesaid, without your needing to prove or show grounds or reasons for your demand or the sum specified therein.

Notwithstanding anything contained hereinabove, our liability under this guarantee is restricted to _____ and it will remain in force upto and including _____ and shall be extended from time to time for such periods as may be advised by M/s on whose behalf this guarantee has been given.

We have power to issue this guarantee in your favour under Memorandum and Articles of Association and the undersigned has full power to do so under the Power of Attorney/ resolution of the Board of Directors dated..... accorded to him by the BANK.

Dated.....this.....day of.....20.....

Signed by

(Person duly authorized by Bank)

Place:

WITNESS :

1..... (Signature)
..... (Printed Name)

2..... (Designation)
.....
(Common Seal)

INSTRUCTIONS FOR FURNISHING CONTRACT PERFORMANCE GUARANTEE

1. The Bank Guarantee by successful bidder(s) will be given on non-judicial stamp paper as per stamp duty applicable. The non-judicial stamp paper should be in name of the issuing bank. In case of foreign bank, the said bank guarantee to be issued by its correspondent bank in India on requisite non-judicial stamp paper and place of bid to be considered as Guwahati.
2. The bank guarantee by bidders will be given from bank as specified in ITB.
3. A letter from the issuing bank of the requisite Bank Guarantee confirming that said bank guarantee and all future communication relating to the Bank Guarantee shall be forwarded to Employer
4. If a bank guarantee is issued by a commercial bank, then a letter to Owner confirming its net worth is more than Rs. 1,000,000,000/- (Rupees one hundred Crores). or its equivalent in foreign currency along with a documentary evidence.

F-24

UNDERTAKING REGARDING SUBMISSION CONTRACT PERFORMANCE SECURITY/ SD WITHIN STIPULATED TIME LINE

(to be submitted on letter head of bidder)

To,
M/s Indradhanush Gas Grid Limited
7th Floor, NRL Centre, G S Road, Christian Basti, Guwahati, Assam – 781005

SUB: TENDER DOCUMENT FOR LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)

TENDER NO: 05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)

Dear Sir,

We hereby confirm that we have clearly understood the requirement of Contract Performance Security/ SD specified in the tender document.

We also hereby confirm that in case of award of contract / order, we will submit Contract Performance Security/ SD within 30 days from the date of Fax of Acceptance.

Place:
Date:

[Signature of Authorized Signatory of Bidder]
Name:
Designation:
Bidder Name:
Seal:

FORMAT F-25

CHECKLIST FOR RUNNING BILLS

SL.No	Document Description	Annexure	Signature Of		
			Contractor	PMC	IGGL
(A) Bill Specific point					
1	Cenvat-able Invoice in Contractor's letter-head raised to "OIC, Indradhanush Gas Grid Limited, * (Place of availment of cervat)"				
2	Memorandum of payment				
3	Abstract of payment sheet dualy adjusted with payment received for the previous inovice				
4	Measurement Sheet				
5	Month wise PF/ESI challan copies				
6	Separate inovice for extra work/AHR items more than SOR quantity				
7	Approval of PMC and IGGL for extra work/AHR items if any				
8	Separate innovice shall be submitted for INR & USD portion				
9	State Wise bifurcation of innoviced amount (State & UTI), wherever applicable (for WCT purpose)				
10	Hard copy of Bill, INR portion (2 original +1 copies)				
11	Hard Copy of bill,USD portion (3 original+ 1 copy)				
12	Soft copy of Bill (Dully tallying with hard copy)				
13	Whether Bill amount/memorandum of payment is matching the amount in service entry sheet				
14	Whether bill has sent through BWS or not(attach BWS receipt)				
15	All the corrections made in the bill should be signed by PMC / IGGL authorized signatory				
16	All the bill documents made namely measurement sheets,bills should tally with the memorandum of payment				
17	SAP service entry sheet dually tallying with the abstract of payment				

FORMAT F-25

CHECKLIST FOR RUNNING BILLS

SL.No	Document Description	Annexure	Signature Of		
			Contractor	PMC	IGGL
(B) General Points					
1	(a) Copy of contractor all risk policy				
	(b) Validity of above exist or not				
2	(a) Free issue material (FIM) insurance copy				
	(b)Validity of above exists or not				
3	(a) Copy of indemnity bond for FIM				
	(b) Validity of above exist or not				
4	(a) Employee Insurance Policy				
	(b) Validity of above exist or not				
5	(a) Workman Compensation insurance policy				
	(b) Validity of above exist or not				
6	Copy of certificate issued by appropriate authority for lowering for lower /non -deduction of WCT/withholdingtax/TDS if applicable				
7	3 original letters of contractor mentioning details such as bank name ,address ,country ,account number and swift code (for forign currency innovice) E-banking details should of SBI/ICICI/HDFC bank only				
8	(a) Copy of contrac PBG separetly for INR & forign currency price				
	(b) Validity of above exist or not				
9	Contract agreement copy				
10	Power of attorny in the name of signatory of the bill /indemnity bond				
11	Copy of PAN umber of contractor				
12	Copy of Contract registration certificate with RBI in case of forign contractor				
13	Copy of registration certificate of TIN/Tan of concerened state in which WOT is deducted & deposited				

NOTE :-

1. There will be signature of concerned contractor, PMC & IGGL representative in place
2. Cenvatalbe invoice, Memorundum of payment to be signed by IGGL Section In-charge & IGGL Construction Incharge
3. Abstract of Payment, measurement sheets are to be signed by IGGL Section Incharge/ his repersentative
4. IGGL spread in-charge / construction in-charge may also require to sign any other relevent documents as applicable from case to case.
5. NOC from sub-contractor, if any (deployed after getting approval from IGGL / PMC) regarding receipt of payment from contractor upto previous month.
6. In case of final bill contractor shall be required to submit NOC & Indeminity Bond and also NOC from sub-contractor about receipt of full payment from the contractor.
7. Copy of Hindrance register for the specified period (RA Bill period) dully signed by contractor /PMC/IGGL/ to be submitted alongwith RA Bill.

FOR CONTRACTOR

_____

FOR PMC / IGGL

_____

F-26
SITE VISIT REPORT

1. Tender Details:

Tender Name	**LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S INDRADHANUSH GAS GRID LIMITED (IGGL)**
Tender No.	**05/51/E-0085/IGGL/001(i) (Tender ID No. 2026_IGGL_288973_1)**
Bidder Name	

2. Site Visit Confirmation:

Site Visit Details	Yes	No	Visit Date
Working conditions understood	☐ Yes	☐ No	
Environmental constraints assessed	☐ Yes	☐ No	
Socio-political conditions assessed	☐ Yes	☐ No	
Construction material availability assessed	☐ Yes	☐ No	

3. Critical Locations Visited:

Facility	Tentative Chainage	Visited	Visit Date
Dispatch Terminal, Madhuban Tiniali, Duliajan	0.000 km	☐Yes ☐No	
SV-03 cum Lepetkata Injection Point	48 km	☐Yes ☐No	
IP-01	96 km	☐Yes ☐No	
Receiving Terminal, SV-14 GNPL, Kumar Gaon	174.236 km	☐Yes ☐No	
Budhi Dihing River Crossing	50.214 km	☐Yes ☐No	
Jokai Forest	2.2-3.4 Km (SV-03 to Lepetkata line)	☐Yes ☐No	

4. Bidder's Declaration:

We hereby declare that the above information and statements regarding the site visit, inspection, and assessment are true and correct.

We understand that this declaration forms an integral part of our bid submission.

Bidder's Representative

Name: _____
Signature: _____
Date: _____

SECTION – IV

GENERAL CONDITION OF CONTRACTS – WORKS (GCC-Works)

GENERAL CONDITIONS OF CONTRACT

FOR

WORKS

IGGL

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SECTION- I DEFINITIONS

1. Definition of Terms:

1.1 In this CONTRACT (as here-in-after defined) the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise required.

1.1.1 The EMPLOYER/COMPANY/IGGL means IGGL., a public limited company, incorporated under the Company's act 2013 and having its registered office at 7th floor, NRL Centre, 122A, GS Road, Christian Basti, Guwahati, Assam and includes its successors and assigns.

1.1.2 The "CONTRACTOR" means the person or the persons, firm or Company or corporation whose tender has been accepted by the EMPLOYER and includes the CONTRACTOR's legal Representatives his successors and permitted assigns.

1.1.3 The ENGINEER/ENGINEER-IN-CHARGE" shall mean the person designated from time to time by the IGGL and shall include those who are expressly authorized by him to act for and on his behalf for operation of this CONTRACT.

1.1.4 The "WORK" shall mean and include all items and things to be supplied/done and services and activities to be performed by the CONTRACTOR in pursuant to and in accordance with CONTRACT or part thereof as the case may be and shall include all extra, additional, altered or substituted works as required for purpose of the CONTRACT.

1.1.5 The "PERMANENT WORK" means and includes works which will be incorporated in and form a part of the work to be handed over to the EMPLOYER by the CONTRACTOR on completion of the CONTRACT.

1.1.6 "CONSTRUCTION EQUIPMENT" means all appliances/equipment and things whatsoever nature for the use in or for the execution, completion, operation, or maintenance of the work or temporary works (as hereinafter defined) but does not include materials or other things intended to form or to be incorporated into the WORK, or camping facilities.

1.1.7 "CONTRACT DOCUMENTS" means collectively the Tender Documents, Designs, Drawings, Specification, Schedule of Quantities and Rates, Letter of Acceptance and agreed variations if any, and such other documents constituting the tender and acceptance thereof.

1.1.8 CONSULTANT: means ---------- who are the consulting engineer to the Employer for this project and having registered office at ----------

1.1.9 The "SUB-CONTRACTOR" means any person or firm or Company (other than the CONTRACTOR) to whom any part of the work has been entrusted by the CONTRACTOR, with the written consent of the ENGINEER-IN-CHARGE, and the legal representatives, successors and permitted assigns of such person, firm or company.

1.1.10 The "CONTRACT" shall mean the Agreement between the EMPLOYER and the CONTRACTOR for the execution of the works including therein all Contract documents.

1.1.11 The "SPECIFICATION" shall mean all directions the various technical specifications, provisions attached and referred to the Tender Documents which pertain to the method and manner of performing the work or works to the quantities and qualities of the work or works and the materials to be furnished under the CONTRACT for the work or works, as may be amplified or modified by the IGGL or ENGINEER-IN-CHARGE during the performance of CONTRACT in order to provide the unforseen conditions or in the best interests of the work or works. It shall also include the latest edition of relevant Standard Specifications including all addenda/corrigenda published before entering into CONTRACT.

1.1.12 The "DRAWINGS" shall include maps, plans and tracings or prints or sketches thereof with any modifications approved in writing by the ENGINEER- IN-CHARGE and such other drawing as may, from time to time, be furnished or approved in writing by the ENGINEER-IN-CHARGE.

1.1.13 The "TENDER" means the proposal along with supporting documents submitted by the CONTRACTOR for consideration by the EMPLOYER.

1.1.14 The "CHANGE ORDER" means an order given in writing by the ENGINEER-IN-CHARGE to effect additions to or deletion from and alteration in the works.

1.1.15 The "COMPLETION CERTIFICATE" shall mean the certificate to be issued by the ENGINEER-IN-CHARGE when the works have been completed entirely in accordance with CONTRACT DOCUMENT to his satisfaction.

1.1.16 The "FINAL CERTIFICATE" in relation to a work means the certificate regarding the satisfactory compliance of various provision of the CONTRACT by the CONTRACTOR issued by the ENGINEER-IN-CHARGE/EMPLOYER after the period of liability is over.

1.1.17 “DEFECT LIABILITY PERIOD” in relation to a work means the specified period from the date of COMPLETION CERTIFICATE upto the date of issue of FINAL CERTIFICATE during which the CONTRACTOR stands responsible for rectifying all defects that may appear in the works executed by the CONTRACTOR in pursuance of the CONTRACT and includes warranties against Manufacturing/Fabrication/ Erection/Construction defects covering all materials plants, equipment, components, and the like supplied by the CONTRACTOR, works executed against workmanship defects.

1.1.18 The "APPOINTING AUTHORITY" for the purpose of arbitration shall be the CHAIRMAN and MANAGING DIRECTOR or any other person so designated by the EMPLOYER.

1.1.19 "TEMPORARY WORKS" shall mean all temporary works of every kind required in or about the execution, completion or maintenance of works.

1.1.20 "PLANS" shall mean all maps, sketches and layouts as are incorporated in the CONTRACT in order to define broadly the scope and specifications of the work or works, and all reproductions thereof.

1.1.21 "SITE" shall mean the lands and other places on, under, in or through which the permanent works are to be carried out and any other lands or places provided by the EMPLOYER for the purpose of the CONTRACT.

1.1.22 "NOTICE IN WRITING OR WRITTEN NOTICE" shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received by the addressee) by registered post to the latest known private or business address or registered office of the addressee and shall be deemed to have been received in the ordinary course of post it would have been delivered.

1.1.23 "APPROVED" shall mean approved in writing including subsequent written confirmation of previous verbal approval and "APPROVAL" means approval in writing including as aforesaid.

1.1.24 "LETTER OF INTENT/FAX OF INTENT" shall mean intimation by a Fax/Letter to Tenderer(s) that the tender has been accepted in accordance with the provisions contained in the letter.

1.1.25 "DAY" means a day of 24 hours from midnight to midnight irrespective of the number of hours worked in that day.

1.1.26 "WORKING DAY" means any day which is not declared to be holiday or rest day by the EMPLOYER.

1.1.27 "WEEK" means a period of any consecutive seven days.

1.1.28 "METRIC SYSTEM" - All technical documents regarding the construction of works are given in the metric system and all work in the project should be carried out according to the metric system. All documents concerning the work shall also be maintained in the metric system.

1.1.29 "VALUE OF CONTRACT" or "TOTAL CONTRACT PRICE" shall mean the sum accepted or the sum calculated in accordance with the prices accepted in tender and/or the CONTRACT rates as payable to the CONTRACTOR for the entire execution and full completion of the work, including change order.

1.1.30 "LANGUAGE FOR DRAWINGS AND INSTRUCTION" All the drawings, titles, notes, instruction, dimensions, etc. shall be in English Language.

1.1.31 "MOBILIZATION" shall mean establishment of sufficiently adequate infrastructure by the CONTRACTOR at "SITE" comprising of construction equipments, aids, tools tackles including setting of site offices with facilities such as power, water, communication etc. establishing manpower organisation comprising of Resident Engineers, Supervising personnel and an adequate strength of skilled, semi-skilled and un-skilled workers, who with the so established infrastructure shall be in a position to

commence execution of work at site(s), in accordance with the agreed Time Schedule of Completion of Work. "MOBILISATION" shall be considered to have been achieved, if the CONTRACTOR is able to establish infrastructure as per Time Schedule, where so warranted in accordance with agreed schedule of work implementation to the satisfaction of ENGINEER-IN-CHARGE/ EMPLOYER.

1.1.32 "COMMISSIONING" shall mean pressing into service of the system including the plant(s), equipment(s), vessel(s), pipeline, machinery(ies), or any other section or sub-section of installation(s) pertaining to the work of the CONTRACTOR after successful testing and trial runs of the same.

"COMMISSIONING" can be either for a completed system or a part of system of a combination of systems or sub-systems and can be performed in any sequence as desired by EMPLOYER and in a manner established to be made suited according to availability of pre-requisites. Any such readjustments made by EMPLOYER in performance of "COMMISSIONING" activity will not be construed to be violating CONTRACT provisions and CONTRACTOR shall be deemed to have provided for the same.

SECTION-II GENERAL INFORMATION

2. General Information

2.1 a) Location of Site: The proposed location of Project site is defined in the Special Conditions of Contract.

b) Access by Road: CONTRACTOR, if necessary, shall build other temporary access roads to the actual site of construction for his own work at his own cost. The CONTRACTOR shall be required to permit the use of the roads so constructed by him for vehicles of any other parties who may be engaged on the project site. The CONTRACTOR shall also facilitate the construction of the permanent roads should the construction there of start while he is engaged on this work. He shall make allowance in his tender for any inconvenience he anticipates on such account.

Non-availability of access roads, railway siding and railway wagons for the use of the CONTRACTOR shall in no case condone any delay in the execution of WORK nor be the cause for any claim for compensation against the EMPLOYER.

2.2 Scope of Work: The scope of WORK is defined in the Technical Part of the tender document. The CONTRACTOR shall provide all necessary materials, equipment, labour etc. for the execution and maintenance of the WORK till completion unless otherwise mentioned in the Tender Document.

2.3 Water Supply: Contractor will have to make his own arrangements for supply of water to his labour camps and for works. All pumping installations, pipe net work and distribution system will have to be carried out by the Contractor at his own risk and cost.

Alternatively the Employer at his discretion may endeavour to provide water to the Contractor at the Employer's source of supply

provided the Contractor makes his own arrangement for the water meter which shall be in custody of the Employer and other pipe net works from source of supply and such distribution pipe network shall have prior approval of the Engineer-in-Charge so as not to interfere with the layout and progress of the other construction works. In such case, the rate for water shall be deducted from the running account bills.

However, the Employer does not guarantee the supply of water and this does not relieve the Contractor of his responsibility in making his own arrangement and for the timely completion of the various works as stipulated.

2.4 Power Supply:

2.4.1 Subject to availability, EMPLOYER will supply power at 400/440 V at only one point at the nearest sub-station, from where the CONTRACTOR will make his own arrangement for temporary distribution. The point of supply will not be more than 500 m away from the CONTRACTOR'S premises. All the works will be done as per the applicable regulations and passed by the ENGINEER-IN-CHARGE. The temporary line will be removed forthwith after the completion of work or if there is any hindrance caused to the other works due to the alignment of these lines, the CONTRACTOR will re-route or remove the temporary lines at his own cost. The CONTRACTOR at his cost will also provide suitable electric meters, fuses, switches, etc. for purposes of payment to the EMPLOYER which should be in the custody and control of the EMPLOYER. The cost of power supply shall be payable to the EMPLOYER every month for Construction Works power which would be deducted from the running account bills. The EMPLOYER shall not, however, guarantee the supply of electricity nor have any liability in respect thereof. No claim for compensation for any failure or short supply of electricity will be admissible.

2.4.2 It shall be the responsibility of the CONTRACTOR to provide and maintain the complete installation on the load side of the supply with due regard to safety requirement at site. All cabling, equipment, installations etc. shall comply in all respects with the latest statutory requirements and safety provisions i.e., as per the Central/State Electricity Acts and Rules etc. The CONTRACTOR will ensure that his equipment and Electrical Wiring etc., are installed, modified, maintained by a licensedElectrician/Supervisor. A test certificate is to be produced to the ENGINEER-IN-CHARGE for his approval, before power is made available.

2.4.3 At all times, IEA regulations shall be followed failing which the EMPLOYER has a right to disconnect the power supply without any reference to the CONTRACTOR. No claim shall be entertained for such disconnection by the ENGINEER-IN-CHARGE. Power supply will be reconnected only after production of fresh certificate from authorized electrical supervisors.

2.4.4 The EMPLOYER is not liable for any loss or damage to the CONTRACTOR's equipment as a result of variation in voltage or frequency or interruption in power supply or other loss to the CONTRACTOR arising therefrom.

2.4.5 The CONTRACTOR shall ensure that the Electrical equipment installed by him are such that average power factors does not fall below 0.90 at his premises. In case power factor falls below 0.90 in any month, he will reimburse to the EMPLOYER at the penal rate determined by the EMPLOYER for all units consumed during the month.

2.4.6 The power supply required for CONTRACTOR's colony near the plant site will be determined by the EMPLOYER and shall be as per State Electricity Board's Rules and other statutory provisions applicable for such installations from time to time. In case of power supply to CONTRACTOR's colony, the power will be made available at a single point and the CONTRACTOR shall make his own arrangement at his own cost for distribution to the occupants of the colony as per Electricity Rules and Acts. The site and colony shall be sufficiently illuminated to avoid accidents.

2.4.7 The CONTRACTOR will have to provide and install his own lights and power meters which will be governed as per Central/State Government Electricity Rules. The metres shall be sealed by the EMPLOYER.

2.4.8 In case of damage of any of the EMPLOYER's equipment on account of fault, intentional or unintentional on the part of the CONTRACTOR, the EMPLOYER reserves the right to recover the cost of such damage from the CONTRACTOR's bill. Cost of HRC Fuses replaced at the EMPLOYER's terminals due to any fault in the CONTRACTOR's installation shall be to CONTRACTOR's account at the rates decided by the ENGINEER-IN-CHARGE.

2.4.9 Only motors upto 3 HP will be allowed to be started direct on line. For motors above 3 HP and upto 100 HP a suitable Starting device approved by the ENGINEER- IN-CHARGE shall be provided by the CONTRACTOR. For motors above 100 HP slipring induction motors with suitable starting devices as approved by the ENGINEER- IN-CHARGE shall be provided by the CONTRACTOR.

2.4.10 The CONTRACTOR shall ensure at his cost that all electrical lines and equipment and all installations are approved by the State Electricity Inspector before power can be supplied to the EMPLOYER.

2.4.11 The total requirement of power shall be indicated by the tenderer alongwith his tender.

2.5 Land for Contractor's Field Office, Godown and Workshop: The EMPLOYER will, at his own discretion and convenience and for the duration of the execution of the work make available near the site, land for construction of CONTRACTOR's Temporary Field Office, godowns workshops and assembly yard required for the execution of the CONTRACT. The CONTRACTOR shall at his own cost construct all these temporary buildings and provide suitable water supply and sanitary arrangement and get the same approved by the ENGINEER-IN-CHARGE.

On completion of the works undertaken by the CONTRACTOR, he shall remove all temporary works erected by him and have the SITE cleaned as directed by ENGINEER-IN-CHARGE. If the

CONTRACTOR shall fail to comply with these requirements, the ENGINEER-IN-CHARGE may at he expenses of the CONTRACTOR remove such surplus, and rubbish materials and dispose off the same as he deems fit and get the site cleared as aforesaid; and CONTRACTOR shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus materials disposed off as aforesaid. But the EMPLOYER reserves the right to ask the CONTRACTOR any time during the pendency of the CONTRACT to vacate the land by giving 7 days notice on security reasons or on national interest or otherwise. Rent may be charged for the land so occupied from contractor by the Employer.

The CONTRACTOR shall put up temporary structures as required by them for their office, fabrication shop and construction stores only in the area allocated to them on the project site by the EMPLOYER or his authorised representative. No tea stalls/canteens should be put up or allowed to be put up by any CONTRACTOR in the allotted land or complex area without written permission of the EMPLOYER.

No unauthorised buildings, constructions or structures should be put up by the CONTRACTOR anywhere on the project site.

For uninterrupted fabrication work, the CONTRACTOR shall put up temporary covered structures at his cost within Area in the location allocated to them in the project site by the EMPLOYER or his authorised representative.

No person except for authorised watchman shall be allowed to stay in the plant area/CONTRACTOR's area after completion of the day's job without prior written permission from ENGINEER-IN-CHARGE.

2.6 Land for Residential Accommodation:-:No Land shall be made available for residential accommodation for staff and labour of CONTRACTOR.

SECTION-III GENERAL INSTRUCTIONS TO TENDERERS

3. Submission of Tender:

3.1 TENDER must be submitted without making any additions, alterations, and as per details given in other clauses hereunder. The requisite details shall be filled in by the TENDERER at space provided under “Submission of Tender at the beginning of GCC of Tender Document. The rate shall be filled only in the schedule given in this Tender Document.

3.2 Addenda/Corrigenda to this Tender Document, if issued, must be signed, submitted alongwith the Tender Document. The tenderer should write clearly the revised quantities in Schedule of Rates of Tender Document and should price the WORK based on revised quantities when amendments of quantities are issued in addenda.

3.3 Covering letter alongwith its enclosures accompanying the Tender Document and all further correspondence shall be submitted in duplicate.

3.4 Tenderers are advised to submit quotations based strictly on the terms and conditions and specifications contained in the Tender Documents and not to stipulate any deviations.

Tenders should always be placed in double sealed covers, superscribing ["QUOTATION DO NOT OPEN" Tender for _____Project of IGGL due for opening on _____]. The *Full Name, Address and Telegraphic Address, Fax No. Of the Tenderers* shall be written on the bottom left hand corner of the sealed cover.

4. Documents:

4.1 General:

The tenders as submitted, will consist of the following:

i) Complete set of Tender Documents (Original) as sold duly filled in and signed by the tenderer as prescribed indifferent clauses of the Tender Documents.

ii) Earnest money in the manner specified in Clause 6 hereof.

iii) Power of Attorney or a true copy thereof duly attested by a Gazetted Officer in case an authorised representative has signed the tender, as required by Clause 14 hereof.

iv) Information regarding tenderers in the proforma enclosed.

v) Details of work of similar type and magnitude carried out by the Tenderer in the proforma provided in the tender document.

vi) Organisation chart giving details of field management at site, the tenderer proposes to have for this job.

vii) Details of construction plant and equipments available with the tenderer for using in this work.

viii) Solvency Certificate from Scheduled Bank to prove the financial ability to carry out the work tendered for.

ix) Latest Balance Sheet and Profit & Loss Account duly audited.

x) Details of present commitment as per proforma enclosed to tender.

xi) Data required regarding SUB-CONTRACTOR(s)/ Supplier/ Manufacturers and other technical informations the tenderer wish to furnish.

xii) Provident fund registration certificate

xiii) List showing all enclosures to tender.

4.2 All pages are to be Initiated: All signatures in Tender Documents shall be dated, as well as, all the pages of all sections of Tender Documents shall be initialed at the lower right hand corner and signed wherever required in the tender papers by the TENDERER

or by a person holding power of attorney authorising him to sign on behalf of the tenderer before submission of tender.

4.3 Rates to be in Figures and Words:The tender should quote in English both in figures as well as in words the rates and amounts tendered by him in the Schedule of Rates of Tender submitted by the CONTRACTOR for each item and in such a way that interpolation is not possible. The amount for each item should be worked out and entered and requisite total given of all items, both in figures and in words. The tendered amount for the work shall be entered in the tender and duly signed by theTenderer.

If some discrepancies are found between the RATES in FIGURES and WORDS or the AMOUNT shown in the tender, the following procedure shall be followed:

a) When there is difference between the rates in figures and words, the rate which corresponds to the amount worked out by the tenderer shall be taken as correct.

b) When the rate quoted by the tenderer in figures and words tally but the amount is incorrect the rate quoted by the tenderer shall be taken as correct.

c) When it is not possible to ascertain the correct rate by either of above methods, the rate quoted in words shall be taken as correct.

4.4 Corrections and Erasures: All correction(s) and alteration(s) in the entries of tender paper shall be signed in full by the TENDERER with date. No erasure or over writing is permissible.

4.5 Signature of Tenderer:

4.5.1 The TENDERER shall contain the name, residence and place of business of person or persons making the tender and shall be signed by the TENDERER with his usual signature. Partnership firms shall furnish the full names of all partners in the tender. It should be signed in the partnership's name by all the partners or by duly authorised representatives followed by the name and designation of the person signing. Tender by a corporation shall be signed by an authorised representative, and a Power of Attorney in that behalf shall accompany the tender. A copy of the constitution of the firm with names of all partners shall be furnished.

4.5.2 When a tenderer signs a tender in a language other than English, the total amount tendered should, in addition, be written in the same language. The signature should be attested by at least one witness.

4.6 Witness: Witness and sureties shall be persons of status and property and their names, occupation and address shall be stated below their signature.

4.7 Details of Experience: The tenderer should furnish, alongwith his tender, details of previous experience in having successfully completed in the recent past works of this nature, together with the names of Employers, location of sites and value of contract, date

of commencement and completion of work, delays if any, reasons of delay and other details alongwith documentary evidence(s).

4.8 Liability of Government of India: It is expressly understood and agreed by and between Bidder or/Contractor and M/s IGGL, and that M/s IGGL., is entering into this agreement solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood and agreed that the Government of India is not a party to this agreement and has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that M/s IGGL. is an independent legal entity with power and authority to enter into contracts solely on its own behalf under the applicable Laws of India and general principles of Contract Law. The Bidder/Contractor expressly agrees, acknowledges and understands that M/s IGGL. is not an agent, representative or delegate of the Government of India. It is further understood and agreed that the Government of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the contract. Accordingly, Bidder/Contractor hereby expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Government of India arising out of this contract and covenants not to sue to Government of India as to any manner, claim, cause of action or thing whatsoever arising of or under this agreement.

5. Transfer of Tender Documents:

5.1 Transfer of Tender Documents purchased by one intending tenderer to another is not permissible.

6. Earnest Money:

6.1 The bidder must pay Earnest Money as given in the letter/notice Inviting tenders and attach the official receipt with the tender failing which the tender is liable to be rejected and representatives of such tenderers will not be allowed to attend the tender opening. Earnest Money can be paid in Demand Drafts or Bank Guarantee or Banker's Cheque or Letter of Credit from any Indian scheduled bank or a branch of an International bank situated in India and registered with Reserve Bank of India as scheduled foreign bank. However, other than the Nationalised Indian Banks, the banks whose BGs are furnished, must be commercial banks having net worth in excess of Rs. 100 crores and a declaration to this effect should be made by such commercial bank either in the bank guarantee itself or separately on a letter head.

The bid guarantee shall be submitted in the prescribed format.

Note: The Bank Guarantee so furnished by the tenderer shall be in the proforma prescribed by the EMPLOYER. No interest shall be paid by the EMPLOYER on the Earnest Money deposited by the tenderer. The Bank Guarantee furnished in lieu of Earnest Money shall be kept valid for a period of "SIX MONTHS" from the date of opening of tender. (TWO MONTHS beyond the bid validity).

The Earnest Money deposited by successful tenderer shall be forfeited if the Contractor fails to furnish the requisite Contract Performance Security as per clause 24 hereof and /or fails to start work within a period of 15 days or fails to execute the AGREEMENT within 15 days of the receipt by him of the Notification of Acceptance of Tender.

Note: The Earnest Money of the unsuccessful bidder will be returned by EMPLOYER/CONSULTANT, directly to the tenderer (s), within a reasonable period of time but not later than 30 days after the expiration of the period of bid validity prescribed by EMPLOYER.

7 Validity:

7.1 Tender submitted by tenderers shall remain valid for acceptance for a period of "03 MONTHS" from the date of opening of the tender. The tenderers shall not be entitled during the said period of 4 months, without the consent in writing of the EMPLOYER, to revoke or cancel his tender or to vary the tender given or any term thereof. In case of tender revoking or canceling his tender or varying any term in regard thereof without the consent of EMPLOYER in writing, the EMPLOYER shall forfeit Earnest Money paid by him alongwith tender.

8 Addenda/Corrigenda

8.1 Addenda/ Corrigenda to the Tender Documents will be issued in duplicate prior to the date of opening of the tenders to clarify documents or to reflect modification in design or CONTRACT terms.

8.2 Each addenda/ corrigendum issued will be issued in duplicate to each person or organisation to whom set of Tender Documents has been issued. Recipient will retain tenderer's copy of each Addendum/Corrigendum and attach original copy duly signed along with his offer. All Addenda/Corrigenda issued shall become part of Tender Documents.

9 Right of Employer to Accept or Reject Tender:

9.1 The right to accept the tender will rest with the EMPLOYER. The EMPLOYER, however, does not bind himself to accept the lowest tender, and reserves to itself the authority to reject any or all the tenders received without assigning any reason whatsoever. At the option of the Employer, the work for which the tender had been invited, may be awarded to one Contractor or split between more than one bidders, in which case the award will be made for only that part of the work, in respect of which the bid has been accepted. The quoted rates should hold good for such eventualities.

Tenders in which any of the particulars and prescribed information are missing or are incomplete in any respect and/or the prescribed conditions are not fulfilled are liable to be rejected. The Tender containing uncalled for remarks or any additional conditions are liable to be rejected.

Canvassing in connection with tenders is strictly prohibited and tenders submitted by the Tenderers who resort to canvassing will be liable to rejection.

10 Time Schedule

10.1 The WORK shall be executed strictly as per the TIME SCHEDULE specified in TENDER/CONTRACT Document. The period of construction given in Time Schedule includes the time required for mobilisation as well as testing, rectifications if any, retesting and completion in all respects to the entire satisfaction of the ENGINEER-IN- CHARGE.

10.2 A joint programme of execution of the WORK will be prepared by the ENGINEER-IN-CHARGE and CONTRACTOR based on priority requirement of this project. This programme will take into account the time of completion mentioned in 10.1 above and the time allowed for the priority works by the ENGINEER-IN-CHARGE.

10.3 Monthly/Weekly construction programme will; be drawn up by the ENGINEER- IN-CHARGE jointly with the CONTRACTOR, based on availability of work fronts and the joint construction programme as per 10.2 above. The CONTRACTOR shall scrupulously adhere to these targets /programmes by deploying adequate personnel, construction tools and tackles and he shall also supply himself all materials of his scope of supply in good time to achieve the targets/programmes. In all matters concerning the extent of targets set out in the weekly and monthly programmes and the degree ofachievements the decision of the ENGINEER-IN-CHARGE will be final and binding on the CONTRACTOR.

11 Tenderer's Responsibility

11.1 The intending tenderers shall be deemed to have visited the SITE and familiarised submitting the tender. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the works in strict conformity with the DRAWINGS and SPECIFICATIONS or for any delay in performance.

12 Retired Government or Company Officers

12.1 No Engineer of Gazetted rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the States/ Central Government or of the EMPLOYER is allowed to work as a CONTRACTOR for a period of two years after his retirement from Government Service, or from the employment of the EMPLOYER without the previous permission of the EMPLOYER. The CONTRACT, if awarded, is liable to be cancelled if either the CONTRACTOR or any of his employees is found at any time to be such a person, who has not obtained the permission of the State/Central Government or of the EMPLOYER as aforesaid before submission of tender, or engagement in the CONTRACTOR'S service as the case may be.

13 Signing of the Contract:

13.1 The successful tenderer shall be required to execute an AGREEMENT in the proforma attached with TENDER DOCUMENT within 15 days of the receipt by him of the Notification of Acceptance of Tender. In the event of failure on the part of the successful tenderer to sign the AGREEMENT within the above stipulated period, the Earnest Money or his initial deposit will be forefeited and the acceptance of the tender shall be considered as cancelled.

14 Field Management & Controlling/Coordinating Authority:

14.1 The field management will be the responsibility of the ENGINEER-IN-CHARGE, who will be nominated by the EMPLOYER. The ENGINEER-IN-CHARGE may also authorise his representatives to assist in performing his duties and functions.

14.2 The ENGINEER-IN-CHARGE shall coordinate the works of various agencies engaged at site to ensure minimum disruption of work carried out by different agencies. It shall be the responsibility of the CONTRACTOR to plan and execute the work strictly in accordance with site instructions to avoid hindrance to the work being executed by other agencies.

15 Note to Schedule of Rates:

15.1 The Schedule of Rates should be read in conjunction with all the other sections of the tender.

15.2 The tenderer shall be deemed to have studied the DRAWINGS, SPECIFICATIONS and details of work to be done within TIME SCHEDULE and to have aquainted himself of the condition prevailing at site.

15.3 Rates must be filled in the Schedule of Rates of original Tender Documents. If quoted in separate typed sheets no variation in item description or specification shall be accepted. Any exceptions taken by the tenderer to the Schedule of Rates shall be brought out in the terms and conditions of the offer.

15.4 The quantities shown against the various items are only approximate. Any increase or decrease in the quantities shall not form the basis of alteration of the rates quoted and accepted.

15.5 The EMPLOYER reserves the right to interpolate the rates for such items of work falling between similar items of lower and higher magnitude.

16 Policy for Tenders Under Consideration:

16.1 Only Those Tenders which are complete in all respects and are strictly in accordance with the Terms and Conditions and Technical Specifications of Tender Document, shall be considered for evaluation. Such Tenders shall be deemed to be under consideration immediately after opening of Tender and until such time an official intimation of acceptance /rejection of Tender is made by IGGL to the Bidder.

16.2 Zero Deviation: Bidders to note that this is a ZERO DEVIATION TENDER. IGGL will appreciate submission of offer based on the terms and conditions in the enclosed General Conditions of Contract (GCC), Special Conditions of Contract (SCC), Instructions to Bidders (ITB), Scope of Work, technical specifications etc. to avoid wastage of time and money in seeking clarifications on technical/ commercial aspects of the offer. Bidder may note that no technical and commercial clarifications will be sought for after the receipt of the bids. In case of any deviation/non conformity observed in the bid, it will be liable for rejection.

17 Award of Contract:

17.1 The Acceptance of Tender will be intimated to the successful Tenderer by IGGL either by Telex/ Telegram/ Fax or by Letter or like means-defined as LETTER OF ACCEPTANCE OF TENDER.

17.2 IGGL will be the sole judge in the matter of award of CONTRACT and the decision of IGGL shall be final and binding.

18 Clarification of Tender Document:

18.1 The Tender is required to carefully examine the Technical Specifications, Conditions of Contract, Drawings and other details relating to WORK and given in Tender Document and fully inform himself as to all conditions and matters which may in any way affect the WORK or the cost thereof. In case the Tenderer is in doubt about the completeness or correctness of any of the contents of the Tender Documents he should request in writing for an interpretation/clarification to IGGL in triplicate. IGGL will then

issue interpretation/clarification to Tendererin writing. Such clarifications and or interpretations shall form part of the Specifications and Documents and shall accompany the tender which shall be submitted by tenderer within time and date as specified in invitations to tender.

18.2 Verbal clarification and information given by IGGL or its employee(s) or its representatives shall not in any way be binding on IGGL.

19 Local Conditions:

19.1 It will be imperative on each tenderer to inform himself of all local conditions and factors which may have any effect on the execution of WORK covered under the Tender Document. In their own interest, the tenderer are requested to familiarise themselves with the Indian Income Tax Act 1961, Indian Companies Act 1956, Indian Customs Act 1962 and other related Acts and Laws and Regulations of India with their latest amendments, as applicable IGGL shall not entertain any requests for clarifications from the tenderer regarding such local conditions.

19.2 It must be understood and agreed that such factors have properly been investigated and considered while submitting the tender. No claim for financial or any other adjustments to VALUE OF CONTRACT, on lack of clarity of such factors shall be entertained.

20 Abnormal Rates:

20.1 The tenderer is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and Conditions of Contract. This will avoid loss of profit or gain in case of curtailment or change of specification for any item. In case it is noticed that the rates quoted by the tenderer for any item are unusually high or unusually low, it will be sufficient cause for the rejection of the tender unless the EMPLOYER is convinced about the reasonableness after scrutiny of the analysis for such rate(s) to be furnished by the tenderer (on demand).

SECTION-IV GENERAL OBLIGATIONS

21 Priority of Contract Documents

21.1 Except if and the extent otherwise provided by the Contract, the provisions of the General Conditions of Contract and Special Conditions shall prevail over those of any other documents forming part of the CONTRACT. Several documents forming the CONTRACT are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the ENGINEER-IN-CHARGE who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:

1) The Contract Agreement;
2) The Letter of Acceptance;
3) The (Instructions to Bidders) ITB;
4) Special Conditions of Contract (SCC);
5) General Conditions of Contract (GCC)
6) Any other document forming part of the Contract.

Works shown in the DRAWING but not mentioned in the SPECIFICATIONS OR described in the SPECIFICATIONS without being shown in the DRAWINGS shall nevertheless be deemed to be included in the same manner as if they had been specifically shown upon the DRAWINGS and described in the SPECIFICATIONS.

21.2 Headings and Marginal Notes: All headings and marginal notes to the clauses of these General Conditions of Contract or to the SPECIFICATIONS or to any other Tender Document are solely for the purpose of giving a concise indication and not a summary of the contents thereof, and they shall never be deemed to be part thereof or be used in the interpretation or construction thereof the CONTRACT.

21.3 Singular and Plural: In CONTRACT DOCUMENTS unless otherwise stated specifically, the singular shall include the plural and vice versa wherever the context so requires.

21.4 Interpretation: Words implying `Persons' shall includer elevant `Corporate Companies / Registered Associations/ Body of Individuals/ Firm of Partnership' as the case may be.

22 Special Conditions of Contract:

22.1 Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, specification of Work, Drawings and any other documents forming part of this CONTRACT wherever the context so requires.

22.2 Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the CONTRACT so far as it may be practicable to do so.

22.3 Where any portion of the General Condition of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.

22.4 Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain WORK or provide certain facilities, it is understood that the CONTRACTOR shall do so at his cost and the VALUE OF CONTRACT shall be deemed to have included cost of such performance and provisions, so mentioned.

22.5 The materials, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the JOB SPECIFICATIONS contained herein and CODES referred to. Where the job specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

23. Contractor to obtain his own Information:

23.1 The CONTRACTOR in fixing his rate shall for all purpose whatsoever reason may be, deemed to have himself independently obtained all necessary information for the purpose of preparing his tender and his tender as accepted shall be deemed to have taken into account all contingencies as may arise

due to such information or lack of same. The correctness of the details, given in the Tender Document to help the CONTRACTOR to make up the tender is not guaranteed.

The CONTRACTOR shall be deemed to have examined the CONTRACT DOCUMENTS, to have generally obtained his own information in all matters whatsoever that might affect the carrying out of the works at the schedules rates and to have satisfied himself to the sufficiency of his tender. Any error in description of quantity or omission therefrom shall not vitiate the CONTRACT or release the CONTRACTOR from executing the work comprised in the CONTRACT according to DRAWINGS and SPECIFICATIONS at the scheduled rates. He is deemed to have known the scope, nature and magnitude of the WORKS and the requirements of materials and labour involved etc., and as to what all works he has to complete in accordance with the CONTRACT documents whatever be the defects, omissions or errors that may be found in the DOCUMENTS. The CONTRACTOR shall be deemed to have visited surroundings, to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and the conditions of the Railways, Roads, Bridges and Culverts, means of transport and communication, whether by land, water or air, and as to possible interruptions thereto and the access and egress from the site, to have made enquiries, examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the sites for disposal of surplus materials, the available accommodation as to whatever required, depots and such other buildings as may be necessary for executing and completing the works, to have made local independent enquiries as to the sub-soil, subsoil water and variations thereof, storms, prevailing winds, climatic conditions and all other similar matters effecting these works. He is deemed to have acquainted himself as to his liability of payment of Government Taxes, Customs duty and other charges, levies etc.

Any neglect or omission or failure on the part of the CONTRACTOR in obtaining necessary and reliable information upon the foregoing or any other matters affecting the CONTRACT shall not relieve him from any risks or liabilities or the entire responsibility from completion of the works at the scheduled rates and times in strict accordance with the CONTRACT.

It is, therefore, expected that should the CONTRACTOR have any doubt as to the meaning of any portion of the CONTRACT DOCUMENT he shall set forth the particulars thereof in writing to EMPLOYER in duplicate, before submission of tender. The EMPLOYER may provide such clarification as may be necessary in writing to CONTRACT, such clarifications as provided by EMPLOYER shall form part of CONTRACT DOCUMENTS.

No verbal agreement or inference from conversation with any effect or employee of the EMPLOYER either before, during or after the execution of the CONTRACT agreement shall in any way affect or modify and of the terms or obligations herein contained.

Any change in layout due to site conditions or technological requirement shall be binding on the CONTRACTOR and no extra claim on this account shall be entertained.

24 Contract Performance Security:

24.1 The CONTRACTOR shall furnish to the EMPLOYER, within 30 days from the date of notification of award, a security in the sum of 10% of the accepted value of the tender or the actual value of work to be done whichever is applicable due to any additional work or any other reasons, in the form of a Bank draft/Banker's cheque or Bank Guarantee or irrevocable Letter of credit (as per proforma enclosed) as Contract Performance Security with the EMPLOYER which will be refunded after the expiry of DEFECTS LIABILITY PERIOD.

24.2 CONTRACTOR can furnish the Contract Performance Security in the form of Demand Draft, Banker's cheque, Insurance security Bond, Fixed deposit receipt or through a Bank Guarantee or through an irrevocable Letter of Credit from any Indian scheduled bank or a branch of an International bank situated in India and registered with Reserve Bank of India as scheduled foreign bank. However, other than the Nationalised Indian Banks, the banks whose BGs are furnished, must be commercial banks having net worth in excess of Rs. 100 crores and a declaration to this effect should be made by such commercial bank either in the bank guarantee itself or separately on a letter head.

The bank guarantee or the Letter of Credit shall be submitted in the prescribed format.

24.3 If the CONTRACTOR/SUB-CONTRACTOR or their employees or the CONTRACTOR's agents and representatives shall damage, break, deface or destroy any property belonging to the EMPLOYER or others during the execution of the CONTRACT, the same shall be made good by the CONTRACTOR at his own expenses and in default thereof, the ENGINEER-IN-CHARGE may cause the same to be made good by other agencies and recover expenses from the CONTRACTOR (for which the certificate of the ENGINEER- IN-CHARGE shall be final).

24.4 All compensation or other sums of money payable by the CONTRACTOR to the EMPLOYER under terms of this CONTRACT may be deducted from or paid by the encashment or sale of a sufficient part of his Contract Performance Security or from any sums which may be due or may become due to the CONTRACTOR by the EMPLOYER of any account whatsoever and in the event of his Contract Performance Security being reduced by reasons of any such deductions or sale of aforesaid, the CONTRACTOR shall within ten days thereafter make good in cash, bank drafts as aforesaid any sum or sums which may have been deducted from or realised by sale of his Contract Performance Security, or any part thereof. No interest shall be payable by the EMPLOYER for sum deposited as Contract Performance Security.

24.5 Failure of the successful bidder to comply with the requirements of this Clause shall constitute sufficient grounds for the annulment of the award and the forfeiture of bid security.

25 Time of Performance:

25.1 Time for Mobilisation

The work covered by this CONTRACT shall be commenced within fifteen (15) days, the date of letter/Fax of Intent and be completed in stages on or before the dates as mentioned in the TIME SCHEDULE OF COMPLETION OF WORK. The CONTRACTOR should bear in mind that time is the essence of this agreement. Request for revision of construction time after tenders are opened

will not receive consideration. The above period of fifteen (15) days is included within the overall COMPLETION SCHEDULE, not over and above the completion time to any additional work or any other reasons.

25.2 Time Schedule of Construction:

25.2.1 The general Time Schedule of construction is given in the TENDER DOCUMENT. CONTRACTOR should prepare a detailed monthly or weekly construction program jointly with the ENGINEER-IN-CHARGE within 15 days of receipt of LETTER/FAX OF INTENT or ACCEPTANCE OF TENDER. The WORK shall be executed strictly as per the Time Schedule given in the CONTRACT DOCUMENT. The period of construction given includes the time required for mobilisation testing, rectifications, if any, retesting and completion in all respects in accordance with CONTRACT DOCUMENT to the entire satisfaction of the ENGINEER-IN-CHARGE.

25.2.2 The CONTRACTOR shall submit a detailed PERT network within the time frame agreed above consisting of adequate number of activities covering various key phases of the WORK such as design, procurement, manufacturing, shipment and field erection activities within fifteen (15) days from the date of LETTER/FAX OF INTENT. This network shall also indicate the interface facilities to be provided by the EMPLOYER and the dates by which such facilities are needed.

25.2.3 CONTRACTOR shall discuss the network so submitted with the EMPLOYER and the agreed network which may be in the form as submitted with the EMPLOYER or in revised form in line with the outcome of discussions shall form part of the CONTRACT, to be signed within fifteen (15) days from the date of LETTER OF ACCEPTANCE OF TENDER. During the performance of the CONTRACT, if in the opinion of the EMPLOYER proper progress is not maintained suitable changes shall be made in the CONTRACTOR's operation to ensure proper progress.

The above PERT network shall be reviewed periodically and reports shall be submitted by the CONTRACTOR as directed by EMPLOYER.

26 Force Majeure:

26.1 CONDITIONS FOR FORCE MAJEURE

In the event of either party being rendered unable by Force Majeure to perform any obligations required to be performed by them under the CONTRACT the relative obligation of the party affected by such Force Majeures shall upon notification to the other party be suspended for the period during which Force Majeures event lasts. The cost and loss sustained by the either party shall be borne by the respective parties.

The term "Force Majeures" as employed herein shall mean acts of God, earthquake, war (declared or undeclared), revolts, riots, fires, floods, rebellions, explosions, hurricane, sabotage, civil commotions and acts and regulations of respective Government of the two parties, namely the EMPLOYER and the CONTRACTOR.

Upon the occurrence of such cause(s) and upon its termination, the party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing immediately but not later than 72 (Seventy-two) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of its claim.

Time for performance of the relative obligation suspended by the Force Majeures shall then stand extended by the period for which such cause lasts.

If deliveries of bought out items and/or works to be executed by the CONTRACTOR are suspended by Force Majeure conditions lasting for more than 2 (two) months the EMPLOYER shall have the option to terminate the CONTRACT or re-negotiate the contract provisions.

26.2 OUTBREAK OF WAR

26.2.1 If during the currency of the CONTRACT there shall be an out-break of war whether declared or not, in that part of the World which whether financially or otherwise materially affect the execution of the WORK the CONTRACTOR shall unless and until the CONTRACT is terminated under the provisions in this clause continue to use his best endeavour to complete the execution of the WORK, provided always that the EMPLOYER shall be entitled, at any time after such out-break of war to terminate or re-negotiate the CONTRACT by giving notice in writing to the CONTRACTOR and upon such notice being given the CONTRACT shall, save as to the rights of the parties under this clause and to the operation of the clauses entitled settlement of Disputes and Arbitration hereof, be terminated but without prejudice to the right of either party in respect of any antecedent breach thereof.

26.2.2 If the CONTRACT shall be terminated under the provisions of the above clause, the CONTRACTOR shall with all reasonable diligence remove from the SITE all the CONTRACTOR's equipment and shall give similar facilities to his SUB-CONTRACTORS to do so.

27 Price reduction schedule:

27.1 Time is the essence of the CONTRACT. In case the CONTRACTOR fails to complete the WORK within the stipulated period, then, unless such failure is due to Force Majeure as defined in Clause 26 here above or due to EMPLOYER's defaults, the Total Executed price shall be reduced by ½ % of the total Executed Price per complete week of delay or part thereof subject to a maximum of 5 % of the Total Executed Price, by way of reduction in price for delay and not as penalty. The said amount will be recovered from amount due to the Contractor/ Contractor's Contract Performance Security payable on demand.

The decision of the ENGINEER-IN-CHARGE in regard to applicability of Price Reduction Schedule shall be final and binding on the CONTRACTOR.

27.2 All sums payable under this clause is the reduction in price due to delay in completion period at the above agreed rate.

27.3 Bonus For Early Completion(*)

27.3 BONUS FOR EARLY COMPLETION

If the Contractor achieves completion of Works in all respect prior to the time schedule stipulated in the SCC, the Employer shall pay to the Contractor the relevant sum, if mentioned specifically in SCC, as bonus for early completion. The bonus for early completion, if provided specifically in SCC, shall be payable to the maximum ceiling of 2 ½ % of the total contract price.

(*) Partial earlier completion may not always produce net benefits to the Employer, for example where utilization of the completed Works requires (a) the fulfillment of all parts of the Contract (e.g. the training of personnel); or (b) the completion of all Sections (e.g. in pipeline laying, where early completion of the laying of pipeline would not be useful if the compressor is still under installation); or (c) certain seasonal effects to take place (e.g. onset of the rainy season, for impounding a reservoir); or (d) other circumstances. Also a more rapid drawdown of budgeted funds may be required. All such factors should be considered prior to the inclusion of a bonus clause in the Contract.

28 Rights of the employer to forfeit contract performance security:

28.1 Whenever any claim against the CONTRACTOR for the payment of a sum of money arises out or under the CONTRACT, the EMPLOYER shall be entitled to recover such sum by appropriating in part or whole the Contract Performance Security of the CONTRACTOR. In the event of the security being insufficient or if no security has been taken from the CONTRACTOR, then the balance or the total sum recoverable, as the case may be shall be deducted from any sum then due or which at any time thereafter may become due to the CONTRACTOR shall pay to the EMPLOYER on demand any balance remaining due.

29 Failure by the contractor to comply with the provisions of the contract:

29.1 If the CONTRACTOR refuses or fails to execute the WORK or any separate part thereof with such diligence as will ensure its completion within the time specified in the CONTRACT or extension thereof or fails to perform any of his obligation under the CONTRACT or in any manner commits a breach of any of the provisions of the CONTRACT it shall be open to the EMPLOYER at its option by written notice to the CONTRACTOR:

a) TO DETERMINE THE CONTRACT in which event the CONTRACT shall stand terminated and shall cease to be in force and effect on and from the date appointed by the EMPLOYER on that behalf, whereupon the CONTRACTOR shall stop forthwith any of the CONTRACTOR's work then in progress, except such WORK as the EMPLOYER may, in writing, require to be done to safeguard any property or WORK, or installations from damage, and the EMPLOYER, for its part, may take over the work remaining unfinished by the CONTRACTOR and complete the same through a fresh contractor or by other means, at the risk and cost of the CONTRACTOR, and any of his sureties if any, shall be liable to the EMPLOYER for any excess cost occasioned by such work having to be so taken over and completed by the EMPLOYER over and above the cost at the rates specified in the schedule of quantities and rate/prices.

b) WITHOUT DETERMINING THE CONTRACT to take over the work of the CONTRACTOR or any part thereof and complete the same through a fresh contractor or by other means at the risk and cost of the CONTRACTOR. The CONTRACTOR and any of his sureties are liable to the EMPLOYER for any excess cost over and above the cost at the rates specified in the Schedule of Quantities/ rates, occasioned by such works having been taken over and completed by the EMPLOYER.

29.2 In such events of Clause 29.1(a) or (b) above.

a) The whole or part of the Contract Performance Security furnished by the CONTRACTOR is liable to be forfeited without prejudice to the right of the EMPLOYER to recover from the CONTRACTOR the excess cost referred to in the sub-clause aforesaid, the EMPLOYER shall also have the right of taking possession and utilising in completing the works or any part thereof, such as materials equipment and plants available at work site belonging to the CONTRACTOR as may be necessary and the CONTRACTOR shall not be entitled for any compensation for use or damage to such materials, equipment and plant.

b) The amount that may have become due to the CONTRACTOR on account of work already executed by him shall not be payable to him until after the expiry of Six (6) calendar months reckoned from the date of termination of CONTRACT or from the taking over of the WORK or part thereof by the EMPLOYER as the case may be, during which period the responsibility for faulty materials or workmanship in respect of such work shall, under the CONTRACT, rest exclusively with the CONTRACTOR. This amount shall be subject to deduction of any amounts due from the CONTRACT to the EMPLOYER under the terms of the CONTRACT authorised or required to be reserved or retained by the EMPLOYER.

29.3 Before determining the CONTRACT as per Clause 29.1(a) or (b) provided in the judgement of the EMPLOYER, the default or defaults committed by the CONTRACTOR is/are curable and can be cured by the CONTRACTOR if an opportunity given to him, then the EMPLOYER may issue Notice in writing calling the CONTRACTOR to cure the default within such time specified in the Notice.

29.4 The EMPLOYER shall also have the right to proceed or take action as per 29.1(a) or (b) above, in the event that the CONTRACTOR becomes bankrupt, insolvent, compounds with his creditors, assigns the CONTRACT in favour of his creditors or any other person or persons, or being a company or a corporation goes into voluntary liquidation, provided that in the said events it shall not be necessary for the EMPLOYER to give any prior notice to the CONTRACTOR.

29.5 Termination of the CONTRACT as provided for in sub- clause 29.1(a) above shall not prejudice or affect their rights of the EMPLOYER which may have accrued upto the date of such termination.

30 Contractor remains liable to pay compensation if

30.1 In any case in which any of the powers conferred upon the EMPLOYER BY CLAUSE 29.0 thereof shall have become

action not taken under clause 29:

exercisable and the same had not been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall not withstanding be exercisable in the event of any further case of default by the CONTRACTOR for which by any clause or clauses hereof he is declared liable to pay compensation amounting to the whole of his Contract Performance Security, and the liability of the CONTRACTOR for past and future compensation shall remain unaffected. In the event of the EMPLOYER putting in force the power under above sub-clause (a), (b) or (c) vested in him under the preceding clause he may, if he so desired, take possession of all or any tools, and plants, materials and stores in or upon the works or the site thereof belonging to the CONTRACTOR or procured by him and intended to be used for the execution of the WORK or any part thereof paying or allowing for the same in account at the CONTRACT rates or in case of these not being applicable at current market rates to be certified by the ENGINEER-IN-CHARGE whose certificate thereof shall be final, otherwise the ENGINEER-IN- CHARGE may give notice in writing to the CONTRACTOR or his clerk of the works, foreman or other authorised agent, requiring him to remove such tools, plant, materials or stores from the premises (within a time to be specified in such notice), and in the event of the CONTRACTOR failing to comply with any such requisition, the ENGINEER-IN-CHARGE may remove them at the CONTRACTOR's expense or sell them by auction or private sale on account of the CONTRACTOR and at his risk in all respects without any further notice as to the date, time or place of sale and the certificate of the ENGINEER-IN-CHARGE as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the CONTRACTOR.

31 Change in constitution:

31.1 Where the CONTRACTOR is a partnership firm, the prior approval of the EMPLOYER shall be obtained in writing, before any change is made in the constitution of the firm. Where the CONTRACTOR is an individual or a Hindu undivided family business concern, such approval as aforesaid shall, likewise be obtained before such CONTRACTOR enters into any agreement with other parties, where under, the reconstituted firm would have the right to carry out the work hereby undertaken by the CONTRACTOR. In either case if prior approval as aforesaid is not obtained, the CONTRACT shall be deemed to have been allotted in contravention of clause 37 hereof and the same action may be taken and the same consequence shall ensure as provided in the said clause.

32 Termination of contract

32(A) TERMINATION OF CONTRACT FOR DEATH:
If the CONTRACTOR is an individual or a proprietary concern and the individual or the proprietor dies or if the CONTRACTOR is a partnership concern and one of the partner dies then unless, the EMPLOYER is satisfied that the legal representative of the individual or the proprietory concern or the surviving partners are capable of carrying out and completing CONTRACT, he (the EMPLOYER) is entitled to cancel the CONTRACT for the uncompleted part without being in any way liable for any compensation payment to the estate of the diseased CONTRACTOR and/or to the surviving partners of the CONTRACTOR'S firm on account of the cancellation of CONTRACT. The decision of the EMPLOYER in such

assessment shall be final and binding on the parties. In the event of such cancellation, the EMPLOYER shall not hold the estate of the diseased CONTRACTOR and/or the surviving partners of the CONTRACTOR'S firm liable for any damages for non-completion of CONTRACT.

32(B) TERMINATION OF CONTRACT IN CASE OF LIQUIDATION / BANKRUPTCY ETC.

If the Contractor shall dissolve or become bankrupt or insolvent or cause or suffer any receiver to be appointed of his business of any assets thereof compound with his Creditors, or being a corporation commence to be wound up, not being a member's voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a Receiver for the benefits of its Creditors any of them, EMPLOYER shall be at liberty:-

To terminate the contract forthwith upon coming to know of the happening of any such event as aforesaid by notice in writing to the Contractor or to give the Receiver or liquidator or other person, the option of carrying out the contract subject to his providing a guarantee upto an amount to be agreed upon by EMPLOYER for due and faithful performance of the contract.

32 (C) TERMINATION OF CONTRACT FOR NON-PERFORMANCE AND SUBSEQUENTLY PUTTING THE CONTRACTOR ON HOLIDAY:

In case of termination of CONTRACT herein set forth (under clause 29.0) except under conditions of Force Majeure and termination after expiry of contract, the CONTRACTOR shall be put under holiday [i.e. neither any enquiry will be issued to the party by IGGL. against any type of tender nor their offer will be considered by IGGL against any ongoing tender (s) where contract between IGGL and that particular CONTRACTOR (as a bidder) has not been finalized] for three years from the date of termination by IGGL. to such CONTRACTOR.

33 Members of the employernot individually liable:

33.1 No Director, or official or employee of the EMPLOYER/ CONSULTANT shall in any way be personally bound or liable for the acts or obligations of the EMPLOYER under the CONTRACT or answerable for any default or omission in the observance or performance of any of the acts, matters or things which are herein contained.

34 Employer not bound by personal representations:

34.1 The CONTRACTOR shall not be entitled to any increase on the scheduled rates or any other right or claim whatsoever by reason of any representation, explanation statement or alleged representation, promise or guarantees given or alleged to have been given to him by any person.

35 Contractor's office at site:

35.1 The CONTRACTOR shall provide and maintain an office at the site for the accommodation of his agent and staff and such office shall be open at all reasonable hours to receive instructions, notice or other communications. The CONTRACTOR at all time shall maintain a site instruction book and compliance of these shall be communicated to the ENGINEER-IN CHARGE from time to time and the whole document to be preserved and handed over after completion of works.

36 Contractor's subordinate staff and their conduct

36.1 The CONTRACTOR, on or after award of the WORK shall name and depute a qualified engineer having sufficient experience in carrying out work of similar nature, to whom the equipments, materials, if any, shall be issued and instructions for works given. The CONTRACTOR shall also provide to the satisfaction of the ENGINEER-IN- CHARGE sufficient and qualified staff to superintend the execution of the WORK, competent sub-agents, foremen and leading hands including those specially qualified by previous experience to supervise the types of works comprised in the CONTRACT in such manner as will ensure work of the best quality, expeditious working. Whenever in the opinion of the ENGINEER-IN-CHARGE additional properly qualified supervisory staff is considered necessary, they shall be employed by the CONTRACTOR without additional charge on accounts thereof. The CONTRACTOR shall ensure to the satisfaction of the ENGINEER-IN-CHARGE that SUB-CONTRACTORS, if any, shall provide competent and efficient supervision, over the work entrusted to them.

36.2 If and whenever any of the CONTRACTOR's or SUB-CONTRACTOR'S agents, sub-agents, assistants, foremen, or other employees shall in the opinion of ENGINEER-IN-CHARGE be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties of that in the opinion of the EMPLOYER or the ENGINEER-IN-CHARGE, it is undesirable for administrative or any other reason for such person or persons to be employed in the works, the CONTRACTOR, is so directed by the ENGINEER-IN- CHARGE, shall at once remove such person or persons from employment thereon. Any person or persons so removed from the works shall not again be employed in connection with the WORKS without the written permission of the ENGINEER-IN- CHARGE. Any person so removed from the WORK shall be immediately re-placed at the expense of the CONTRACTOR by a qualified and competent substitute. Should the CONTRACTOR be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection herewith.

36.3 The CONTRACTOR shall be responsible for the proper behaviour of all the staff, foremen, workmen, and others, and shall exercise a proper degree of control over them and in particular and without prejudice to the said generality, the CONTRACTOR shall be bound to prohibit and prevent any employees from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighborhood and in the event of such employee so trespassing, the CONTRACTOR shall be responsible therefore and relieve the EMPLOYER of all consequent claims or actions for damages or injury or any other grounds whatsoever. The decision of the ENGINEER-IN-CHARGE upon any matter arising under this clause shall be final. The CONTRACTOR shall be liable for any liability to EMPLOYER on account of deployment of CONTRACTOR's staff etc. or incidental or arising out of the execution of CONTRACT.

The CONTRACTOR shall be liable for all acts or omissions on the part of his staff, Foremen and Workmen and others in his employment, including misfeasance or negligence of whatever

kind in the course of their work or during their employment, which are connected directly or indirectly with the CONTRACT.

36.4 If and when required by the EMPLOYER and CONTRACTOR's personnel entering upon the EMPLOYER's premises shall be properly identified by badges of a type acceptable to the EMPLOYER which must be worn at all times on EMPLOYER's premises. CONTRACTOR may be required to obtain daily entry passes for his staff/employees from EMPLOYER to work within operating areas. These being safety requirements, no relaxations on this account shall be given to CONTRACTOR.

36 Sub-letting of Works:

37.1 No part of the CONTRACT nor any share or interest therein shall in any manner or degree be transferred, assigned or sublet by the CONTRACTOR directly or indirectly to any person, firm or corporation whatsoever without the consent in writing, of the ENGINEER/EMPLOYER except as provided for in the succeeding sub-clause.

i) SUB-CONTRACTS FOR TEMPORARY WORKS ETC.:

The EMPLOYER may give written consent to Sub- contract for the execution of any part of the WORK at the site, being entered in to by CONTRACTOR provided each individual Sub- contract is submitted to the ENGINEER-IN-CHARGE before being entered into and is approved by him.

ii) LIST OF SUB-CONTRACTORS TO BE SUPPLIED:

At the commencement of every month the CONTRACTOR shall furnish to the ENGINEER-IN- CHARGE list of all SUB-CONTRACTORS or other persons or firms engaged by the CONTRACTOR and working at the SITE during the previous month with particulars of the general nature of the Subcontract or works done by them.

iii) CONTRACTOR'S LIABILITY NOT LIMITED BY SUB-CONTRACTORS:

Notwithstanding any sub-letting with such approval as aforesaid and notwithstanding that the ENGINEER-IN-CHARGE shall have received copies of any Subcontracts, the contractor shall be and shall remain solely responsible for the quality, proper and expeditious execution of the Contract in all respects as if such sub-letting or Subcontracting had not taken place, and as if such work had been done directly by the CONTRACTOR. The CONTRACTOR shall bear all responsibility for any act or omission on the part of sub-contractors in regard to work to be performed under the CONTRACT.

iv) EMPLOYER MAY TERMINATE SUB-CONTRACTS:

If any SUB-CONTRACTOR engaged upon the works at the site executes any works which in the opinion of the ENGINEER-IN-CHARGE is not in accordance with the CONTRACT documents, the EMPLOYER may by written notice to the CONTRACTOR request him to terminate such subcontract and the CONTRACTOR upon the receipt of

such notice shall terminate such Subcontract and dismiss the SUB-CONTRACTOR(S) and the later shall forthwith leave the works, failing which the EMPLOYER shall have the right to remove such SUB- CONTRACTOR(S) from the site.

v) NO REMEDY FOR ACTION TAKEN UNDER THIS CLAUSE:

No action taken by the EMPLOYER under the clause shall relieve the CONTRACTOR of any of his liabilities under the CONTRACT or give rise to any right or compensation, extension of time or otherwise failing which the EMPLOYER shall have the right to remove such SUB-CONTRACTOR(S) from the site.

37 Power of entry:

38.1 If the CONTRACTOR shall not commence the WORK in the manner previously described in the CONTRACT documents or if he shall at any time in the opinion of the ENGINEER-IN-CHARGE.

i) fail to carry out the WORK in conformity with the CONTRACT documents, or

ii) fail to carry out the WORK in accordance with the Time Schedule, or

iii) substantially suspend work or the WORK for a period of fourteen days without authority from the ENGINEER-IN-CHARGE, or

iv) fail to carry out and execute the WORK to the satisfaction of the ENGINEER-IN-CHARGE, or

v) fail to supply sufficient or suitable construction plant, temporary works, labour, materials or things, or

vi) Commit, suffer, or permit any other breach of any of the provisions of the CONTRACT on his part to be performed or observed or persist in any of the above mentioned breaches of the CONTRACT for fourteen days, after notice in writing shall have been given to the CONTRACTOR by the ENGINEER-IN-CHARGE requiring such breach to be remedied, or

vii) if the CONTRACTOR shall abandon the WORK, or

viii) If the CONTRACTOR during the continuance of the CONTRACT shall become bankrupt, make any arrangement or composition with his creditors, or permit any execution to be levied or go into liquidation whether compulsory or voluntary not being merely a voluntary liquidation for the purpose of amalgamation or reconstruction

then in any such case, the EMPLOYER shall have the power to enter upon the WORK and take possession thereof and of the materials, temporary WORK, construction plant, and stock thereon, and to revoke the CONTRACTOR's licence to use the same, and to complete the WORK by his agents, other CONTRACTORS or workmen or to relate the same upon any terms and to such other person, firm or corporation as the

EMPLOYER in his absolute discretion may think proper to employ and for the purpose aforesaid to use or authorise the use of any materials, temporary work, CONSTRUCTION PLANT, and stock as aforesaid, without making payment or allowance to the CONTRACTOR for the said materials other than such as may be certified in writing by the ENGINEER-IN-CHARGE to be reasonable, and without making any payment or allowance to the CONTRACTOR for the use of the temporary said works, construction plant and stock or being liable for any loss or damage thereto, and if the EMPLOYER shall by reason of his taking possession of the WORK or of the WORK being completed by other CONTRACTOR (due account being taken of any such extra work or works which may or be omitted) then the amount of such excess as certified by the ENGINEER-IN-CHARGE shall be deducted from any money which may be due for work done by the CONTRACTOR under the CONTRACT and not paid for. Any deficiency shall forthwith be made good and paid to the EMPLOYER by the CONTRACTOR and the EMPLOYER shall have power to sell in such manner and for such price as he may think fit all or any of the construction plant, materials etc. constructed by or belonging to and to recoup and retain the said deficiency or any part thereof out of proceeds of the sale.

38 Contractor's responsibility with the mechanical, electrical, intercommunication system, air conditioning contractors and other agencies:

39.1 Without repugnance of any other condition, it shall be the responsibility of the CONTRACTOR executing the work of civil construction, to work in close cooperation and coordinate the WORK with the Mechanical, Electrical, Air-conditioning and Intercommunication Contractor's and other agencies or their authorised representatives, in providing the necessary grooves, recesses, cuts and opening etc., in wall, slabs beams and columns etc. and making good the same to the desired finish as per specification, for the placement of electrical, intercommunication cables, conduits, air-conditioning inlets and outlets grills and other equipments etc. where required. For the above said requirements in the false ceiling and other partitions, the CONTRACTOR before starting-up the work shall in consultation with the Electrical, Mechanical, Intercommunication, Air-conditioning contractor and other agencies prepare and put-up a joint scheme, showing the necessary openings, grooves, recesses, cuts, the methods of fixing required for the WORK of the aforesaid, and the finishes therein, to the ENGINEER-IN-CHARGE and get the approval. The CONTRACTOR before finally submitting the scheme to the ENGINEER-IN-CHARGE, shall have the written agreement of the other agencies. The ENGINEER- IN-CHARGE, before communicating his approval to the scheme, with any required modification, shall get the final agreement of all the agencies, which shall be binding. No claim shall be entertained on account of the above.

The CONTRACTOR shall confirm in all respects with provision of any statutory regulations, ordinances or byelaws of any local or duly constituted authorities or public bodies which may be applicable from time to time to the WORK or any temporary works. The CONTRACTOR shall keep the EMPLOYER indemnified against all penalties and liabilities of every kind, arising out of non- adherance to such stains, ordinances, laws, rules, regulations, etc.

40 Other agencies at site:

40.1 The CONTRACTOR shall have to execute the WORK in such and conditions where other agencies will also be engaged for other works such as site grading, filling, and levelling, electrical and mechanical engineering works, etc. No claim shall be entertained due to WORK being executed in the above circumstances.

41 Notice:

41.1 TO THE CONTRACTOR:

Any notice hereunder may be served on the CONTRACTOR or his duly authorised representative at the job site or may be served by registered mail direct to the address furnished by the CONTRACTOR. Proof of issue of any such notice could be conclusive of the CONTRACTOR having been duly informed of all contents therein.

41.2 TO THE EMPLOYER:

Any notice to be given to the EMPLOYER under the terms of the CONTRACTOR shall be served by sending the same by Registered mail to or delivering the same at the respective site offices of M/S. IGGL addressed to the HEAD/SITE-IN CHARGE.

42 Right of various interests:

42.1 i) The EMPLOYER reserves the right to distribute the work more than one agency (ies). The CONTRACTOR shall cooperate and afford other agency(ies)reasonable opportunity for access to the WORK for the carriage and storage of materials and execution of their works.

ii) Wherever the work being done by any department of the EMPLOYER or by other agency(ies) employed by the EMPLOYER is contingent upon WORK covered by this CONTRACT, the respective rights of the various interests involved shall be determined by the ENGINEER-IN-CHARGE to secure the completion of the various portions of the work in general harmony.

43 Patents and royalties:

43.1 The CONTRACTOR, if licensed under any patent covering equipment, machinery, materials or compositions of matter to be used or supplied or methods and process to be practised or employed in the performance of this CONTRACT, agrees to pay all royalties and licence fees which may be due with respect thereto. If any equipment, machinery, materials, composition of matters, be used or supplied or methods and processes to be practised or employed in the performance of this CONTRACT, is covered by a patent under which the CONTRACTOR is not licensed then the CONTRACTOR before supplying or using the equipment, machinery materials, composition method or processes shall obtain such licences and pay such royalties and licence fees as may be necessary for performance of this CONTRACT. In the event the CONTRACTOR fails to pay any such royalty or obtain any such licence, any suit for infringement of such patents which is brought against the CONTRACTOR or the EMPLOYER as a result such failure will be defended by the CONTRACTOR at his own expense and the CONTRACTOR will pay any damages and costs awarded in such suit. The CONTRACTOR shall promptly notify the EMPLOYER if the CONTRACTOR has acquired the knowledge of any plant under

which a suit for infringement could be reasonably brought because of the use by the EMPLOYER of any equipment, machinery, materials, process, methods to be supplied hereunder. The CONTRACTOR agrees to and does hereby grant to EMPLOYER, together with the right to extend the same to any of the subsidiaries of the EMPLOYER as irrevocable, royalty free licence to use in any country, any invention made by the CONTRACTOR or his employee in or as result of the performance of the WORK under the CONTRACT.

43.2 All charges on account of royalty. toilage, rent, octroi terminal or sales tax and/or other duties or any other levy on materials obtained for the work or temporary work or part thereof (excluding materials provided by the EMPLOYER) shall be borne by the CONTRACTOR.

43.3 The CONTRACTOR shall not sell or otherwise dispose of or remove except for the purpose of this CONTRACT, the sand, stone, clay, ballast, earth, rock or other substances, or materials obtained from any excavation made for the purpose of the WORK or any building or produce upon the site at the time of delivery of the possession thereof, but all such substances, materials, buildings and produce shall be the property of the EMPLOYER provided that the CONTRACTOR may with the permission of the ENGINEER-IN-CHARGE, use the same for the purpose of the work by payment of cost of the same at such a rate as may be determined by the ENGINEER-IN-CHARGE.

43.4 The EMPLOYER shall indemnify and save harmless the CONTRACTOR from any loss on account of claims against CONTRACTOR for the contributory infringement of patent rights arising out and based upon the claim that the use of the EMPLOYER of the process included in the design prepared by the EMPLOYER and used in the operation of the plant infringes on any patent right. With respect to any subcontract entered into by CONTRACTOR pursuant to the provisions of the relevant clause hereof, the CONTRACTOR shall obtain from the SUB-CONTRACTOR an undertaking to provide the EMPLOYER with the same patent protection that CONTRACTOR is required to provide under the provisions of this clause.

44 Liens:

44.1 If, at any time there should be evidence or any lien or claim for which the EMPLOYER might have become liable and which is chargeable to the CONTRACTOR, the EMPLOYER shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify the EMPLOYER against such lien or claim and if such lien or claim be valid, the EMPLOYER may pay and discharge the same and deduct the amount so paid from any money which may be or may become due and payable to the CONTRACTOR. If any lien or claim remain unsettled after all payments are made, the CONTRACTOR shall refund or pay to the EMPLOYER all money that the latter may be compelled to pay in discharging such lien or claim including all costs and reasonable expenses. EMPLOYER reserves the right to do the same.

44.2 The EMPLOYER shall have lien on all materials, equipments including those brought by the CONTRACTOR for the purpose of erection, testing and commissioning of the WORK.

44.3 The final payment shall not become due until the CONTRACTOR delivers to the ENGINEER-IN-CHARGE a complete release or waiver of all liens arising or which may arise out of his agreement or receipt in full or certification by the CONTRACTOR in a form approved by ENGINEER-IN-CHARGE that all invoices for labour, materials, services have been paid in lien thereof and if required by the ENGINEER-IN-CHARGE in any case an affidavit that so far as the CONTRACTOR has knowledge or information the releases and receipts include all the labour and material for which a lien could be filled.

44.4 CONTRACTOR will indemnify and hold the EMPLOYER harmless, for a period of two years after the issue of FINAL CERTIFICATE, from all liens and other encumbrances against the EMPLOYER on account of debts or claims alleged to be due from the CONTRACTOR or his SUB-CONTRACTOR to any person including SUB- CONTRACTOR and on behalf of EMPLOYER will defend at his own expense, any claim or litigation brought against the EMPLOYER or the CONTRACTOR in connection therewith. CONTRACTOR shall defend or contest at his own expense any fresh claim or litigation by any person including his SUB-CONTRACTOR, till its satisfactory settlement even after the expiry of two years from the date of issue of FINAL CERTIFICATE.

45 Delays by employer or his authorised agents:

45.1 In case the CONTRACTOR's performance is delayed due to any act omission on the part of the EMPLOYER or his authorised agents, then the CONTRACTOR shall be given due extension of time for the completion of the WORK, to the extent such omission on the part of the EMPLOYER has caused delay in the CONTRACTOR's performance of his WORK.

45.2 No adjustment in CONTRACT PRICE shall be allowed for reasons of such delays and extensions granted except as provided in TENDER DOCUMENT, where the EMPLOYER reserves the right to seek indulgence of CONTRACTOR to maintain the agreed Time Schedule of Completion.

In such an event the CONTRACTOR shall be obliged for working by CONTRACTOR's personnel for additional time beyond stipulated working hours as also Sundays and Holidays and achieve the completion date/interim targets.

46 Payment if the contract is terminated:

46.1 If the CONTRACT shall be terminated as per Tender pursuant to Clause no. 29 of GCC, the CONTRACTOR shall be paid by the EMPLOYER in so far as such amounts or items shall not have already been covered by payments of amounts made to the CONTRACTOR for the WORK executed and accepted by ENGINEER-IN-CHARGE prior to the date of termination at the rates and prices provided for in the CONTRACT and in addition to the following:

a) The amount payable in respect of any preliminary items, so far as the Work or service comprised therein has been carried out or performed and an appropriate portion as certified by ENGINEER-IN- CHARGE of any such items or service comprised in which has been partially carried out or performed.

b) Any other expenses which the CONTRACTOR has expended for performing the WORK under the CONTRACT subject to being duly recommended by ENGINEER-IN-CHARGE and approved by EMPLOYER for payment, based on documentary evidence of his having incurred such expenses.

46.2 The CONTRACTOR will be further required to transfer the title and provide the following in the manner and as directed by the EMPLOYER.

c) Any and all completed works.

d) Such partially completed WORK including drawings, informations and CONTRACT rights as the CONTRACTOR has specially performed, produced or acquired for the performance of the CONTRACTOR.

46 No waiver of rights:

47.1 Neither the inspection by the EMPLOYER or any of their officials, employees, or agents nor any order by the EMPLOYER for payment of money or any payment for or acceptance of the whole or any part of the Work by the EMPLOYER nor any extension of time, nor any possession taken by EMPLOYER shall operate as a waiver of any provision of the CONTRACT, or of any power herein reserved to the EMPLOYER, or any right to damages herein provided, nor shall any waiver of any breach in the CONTRACT be held to be a waiver of any other subsequent breach.

47 Certificate not to affect right of employer and liability of contractor:

48.1 No interim payment certificate(s) issued by the Engineer-in-Charge of the EMPLOYER, nor any sum paid on account by the EMPLOYER, nor any extension of time for execution of the work granted by EMPLOYER shall affect or prejudice the rights of the Employer against the CONTRACTOR or relieve the CONTRACTOR of his obligations for the due performance of the CONTRACT, or be interpreted as approval of the WORK done or of the equipment supplied and no certificate shall create liability for the EMPLOYER to pay for alterations, amendments, variations or additional works not ordered, in writing, by EMPLOYER or discharge the liability of the CONTRACTOR for the payment of damages whether due, ascertained, or certified or not or any sum against the payment of which he is bound to indemnify the EMPLOYER.

49 Language and measures:

49.1 All documents pertaining to the CONTRACT including Specifications, Schedules, Notices, Correspondence, operating and maintenance Instructions, DRAWINGS, or any other writing shall be written in English language. The Metric System of measurement shall be used in the CONTRACT unless otherwise specified.

50 Transfer of title:

50.1 The title of Ownership of supplies furnished by the CONTRACTOR shall not pass on to the EMPLOYER for all Supplies till the same are finally accepted by the EMPLOYER after the successful completion of PERFORMANCE TEST and GUARANTEE TEST and issue of FINAL CERTIFICATE.

50.2 However, the EMPLOYER shall have the lien on all such works performed as soon as any advance or progressive payment is made by the EMPLOYER to the CONTRACTOR and the

CONTRACTOR shall not subject these works for use other than those intended under this CONTRACT.

51 Release of information:

51.1 The CONTRACTOR shall not communicate or use in advertising, publicity, sales releases or in any other medium, photographs, or other reproduction of the Work under this CONTRACT or description of the site dimensions, quantity, quality or other information, concerning the Work unless prior written permission has been obtained from the EMPLOYER.

52 Brand names:

52.1 The specific reference in the SPECIFICATIONS and documents to any material by trade name, make or catalogue number shall be construed as establishing standard or quality and performance and not as limited competition. However, TENDERER may offer other similar equipments provided it meets the specified standard design and performance requirements.

53 Completion of contract:

53.1 Unless otherwise terminated under the provisions of any other relevant clause, this CONTRACT shall be deemed to have been completed at the expiration of the PERIOD OF LIABILITY as provided for under the CONTRACT.

54 Spares:

54.1 The CONTRACTOR shall furnish to the EMPLOYER all spares required for COMMISSIONING of the plants, recommendatory and/or mandatory spares, which are required essential by the manufacturer/supplier. The same shall be delivered at SITE, 3(Three) months before COMMISSIONING.

Also the CONTRACTOR should furnish the manufacturing drawings for fast wearing spares.

54.2 The CONTRACTOR guarantees the EMPLOYER that before the manufacturers of the equipments, plants and machineries go out of production of spare parts for the equipment furnished and erected by him, he shall give at least twelve (12) months' advance notice to the EMPLOYER, so that the latter may order his requirement of spares in one lot, if he so desires.

SECTION-V PERFORMANCE OF WORK

55 Execution of work:

55.1 All the Works shall be executed in strict conformity with the provisions of the CONTRACT Documents and with such explanatory detailed drawings, specification and instructions as may be furnished from time to time to the CONTRACTOR by the ENGINEER-IN-CHARGE whether mentioned in the CONTRACT or not. The CONTRACTOR shall be responsible for ensuring that works throughout are executed in the most substantial, proper and workmanlike manner with the quality of material and workmanship in strict accordance with the SPECIFICATIONS and to the entire satisfaction of the ENGINEER-IN-CHARGE. The CONTRACTOR shall provide all necessary materials equipment labour etc. for execution and maintenance of WORK till completion unless otherwise mentioned in the CONTRACT.

56	**Co-ordination and inspection of Work:**	56.1	The coordination and inspection of the day-to-day work under the CONTRACT shall be the responsibility of the ENGINEER-IN-CHARGE. The written instruction regarding any particular job will normally be passed by the ENGINEER-IN-CHARGE or his authorised representative. A work order book will be maintained by the CONTRACTOR for each sector in which the aforesaid written instructions will be entered. These will be signed by the CONTRACTOR or his authorised representative by way of acknowledgement within 12 hours.
57	**Work in monsoon and dewatering:**	57.1	Unless otherwise specified elsewhere in the tender, the execution of the WORK may entail working in the monsoon also. The CONTRACTOR must maintain a minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered for such work in monsoon.
		57.2	During monsoon and other period, it shall be the responsibility of the CONTRACTOR to keep the construction work site free from water at his own cost.
58	**Work on Sundays and Holidays:**	58.1	For carrying out Work on Sundays, and Holidays, the CONTRACTOR will approach the ENGINEER-IN-CHARGE or his representative at least two days in advance and obtain permission in writing. The CONTRACTOR shall observe all labour laws and other statutory rules and regulations in force. In case of any violations of such laws, rules and regulations, consequence if any, including the cost thereto shall be exclusively borne by the CONTRACTOR and the EMPLOYER shall have no liability whatsoever on this account.
59	**General conditions for construction and erection work:**	59.1	The working time at the site of work is 48 hours per week.Overtime work is permitted in cases of need and the EMPLOYER will not compensate the same. Shift workingat 2 or 3 shifts per day will become necessary and the CONTRACTOR should take this aspect into consideration for formulating his rates for quotation. No extra claims will be entertained by the EMPLOYER no this account. For carrying out work beyond working hours the CONTRACTOR will approach the ENGINEER-IN-CHARGE or his authorised representative and obtain his prior written permission.
		59.2	The CONTRACTOR must arrange for the placement of workers in such a way that the delayed completion of the WORK or any part thereof for any reason whatsoever will not affect their proper employment. The EMPLOYER will not entertain any claim for idle time payment whatsoever.
		59.3	The CONTRACTOR shall submit to the EMPLOYER/ENGINEER-IN- CHARGE reports at regular intervals regarding the state and progress of WORK. The details and proforma of the report will mutually be agreed after the award of CONTRACT. The CONTRACTOR shall provide display boards showing progress and labour strengths at worksite, as directed by the ENGINEER-IN-CHARGE.

60 Alterations in specifications, design and extra works:

60.1 The WORK covered under this CONTRACT having to be executed by the CONTRACTOR on a lumpsum firm price/item rate quoted by him, the EMPLOYER will not accept any proposals for changes in VALUE OF CONTRACT or extension in time on account of any such changes which may arise to the CONTRACTOR's scope of WORK as a result of detailed Engineering and thereafter during the execution of WORK. The only exception to this will be a case where the EMPLOYER requests in writing to the CONTRACTOR to upgrade the SPECIFICATIONS or the size of any major pieces of equipments, plant or machinery beyond what is normally required to meet the scope of WORK as defined in the CONTRACT DOCUMENT.

In such cases, a change order will be initialled by the CONTRACTOR at the appropriate time for the EMPLOYER's prior approval giving the full back-up data for their review and for final settlement of any impact on price within 30 (thirty) days thereafter.

60.2 The ENGINEER-IN-CHARGE shall have to make any alterations in, omission from, additions to or substitutions for, the Schedule of Rates, the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the WORK and the CONTRACTOR shall be bo und to carry out the such altered/ extra/ new items of WORK in accordance with any instructions which may be given to him in writing signed by the ENGINEER-IN- CHARGE, and such alterations, omissions, additions or substitutions shall not invalidate the CONTRACT and any altered, additional or substituted work which the CONTRACTOR may be directed to do in the manner above specified as part of the WORK shall be carried out by the CONTRACTOR on the same conditions in all respects on which he agreed to do the main WORK. The time of completion of WORK may be extended for the part of the particular job at the discretion of the ENGINEER-IN-CHARGE, for only such alterations, additions or substitutions of the WORK, as he may consider as just and reasonable. The rates for such additional, altered or substituted WORK under this clause shall be worked out in accordance with the following provisions:-

I. <u>For Item Rate Contract</u>

a) If the rates for the additional, altered or substituted WORK are specified in the CONTRACT for the WORK, the CONTRACTOR is bound to carry on the additional, altered or substituted WORK at the same rates as are specified in the CONTRACT.

b) If the rates for the additional, altered or substituted WORK are not specifically provided in the CONTRACT for the WORK, the rates will be derived from the rates for similar class of WORK as are specified in the CONTRACT for the WORK. The opinion of the ENGINEER-IN-CHARGE, as to whether or not the rates can be reasonably so derivedfrom the items in this CONTRACT will be final and binding on the CONTRACTOR.

c) If the rates for the altered, additional or substituted WORK cannot be determined in the manner specified in sub-clause(s) and (b) above, then the CONTRACTOR shall, within 7 days of the date of receipt of order to carry out the WORK, inform the ENGINEER-IN-CHARGE of the rates which it is his intention to charge for such class of WORK, supported by analysis of the rate or rates claimed, and the ENGINEER-IN-CHARGE shall determine the rate or rates on the basis of the prevailing market rates, labour cost at schedule of labour rates plus 10% to cover contractor's supervision, overheads and profit and pay the CONTRACTOR accordingly. The opinion of the ENGINEER- IN-CHARGE as to current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the CONTRACTOR.

d) Where the item of work will be executed through nominated specialist agency as approved by the ENGINEER-IN-CHARGE, then the actual amount paid to such nominated agency supported by documentary evidence and as certified by ENGINEER-IN-CHARGE shall be considered plus 10% (ten percent) to cover all contingencies, overhead, profits to arrive at the rates.

e) Provisions contained in the Sub-clause (a) & (d) above shall, however, not apply for the following:-

Where the value of additions of new items together with the value of alterations, additions/deletions or substitutions does not exceed by or is not less than plus/minus (±)25% of the VALUE OF CONTRACT. The item rates in the Schedule of Rates shall hold good for all such variations between the above mentioned limits, irrespective of any increase/decrease of quantities in the individual items of Schedule of Rates.

Where the value of addition of new items together with the value of alterations, additions/deletions or substitutions reduces more than 25% of the contract value but is within the following limits the tenderer shall be paid compensation for decrease in the value of work, as follows:

S.No.	Range of Variation	Percentage compensation for decrease in the value of work in the respective range.
a)	Beyond (+) 25% upto & inclusive of (+) 50%	No increase and/or decrease shall be applicable for the Schedule of Rates

(The rates quoted for this increase shall be valid).

b) Beyond (-) 25% upto & inclusive of(-) 50% — For reduction beyond 25% contractor shall be compensated by an amount equivalent to 10% of the reduction in value of the contract as awarded. For example if the actual contract value is 70% of awarded value then compensation shall be 10% of (75-70) i.e. 0.5% of awarded contract value.

II. For Lumpsum Contracts

CONTRACTOR shall, within 7 days of the date of receipt of order to carry out the WORK, inform the ENGINEER-IN- CHARGE of the rates which it is his intention to charge for such class of WORK, supported by analysis of the rate or rates claimed, and the ENGINEER-IN-CHARGE shall determine the rate or rates on the basis of the prevailing market rates, labour cost at schedule of labour rates plus 10% to cover contractor's supervision, overheads and profit and pay the CONTRACTOR accordingly. The opinion of the ENGINEER- IN-CHARGE as to current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the CONTRACTOR.

61 Drawings to be supplied by the employer

61.1 The drawings attached with tender are only for the general guidance to the CONTRACTOR to enable him to visualize the type of work contemplated and scope of work involved. The CONTRACTOR will be deemed to have studied the DRAWINGS and formed an idea about the WORK involved.

61.2 Detailed working drawings on the basis of which actual execution of the WORK is to proceed, will be furnished from time to time during the progress of the work. The CONTRACTOR shall be deemed to have gone through the DRAWINGS supplied to him thoroughly and carefully and in conjunction with all other connected drawings and bring to the notice of the ENGINEER-IN-CHARGE discrepancies, if any, therein before actually carrying out the Work.

61.3 Copies of all detailed working drawings relating to the WORK shall be kept at the CONTRACTOR's office on the site and shall be made available to the ENGINEER-IN- CHARGE at any time during the CONTRACT. The drawings and other documents issued by the EMPLOYER shall be returned to the EMPLOYER on completion of the WORK.

62 Drawings to be supplied by the contractor:

62.1 The drawings/date which are to be furnished by the CONTRACTOR are enumerated in the special conditions of contract, and shall be furnished within the specified time.

62.2 Where approval/review of drawings before manufacture/ construction/fabrication has been specified, it shall be CONTRACTOR's responsibility to have these drawings prepared as per the directions of ENGINEER-IN-CHARGE and got approved before proceeding with manufacture/construction/fabrication as the case may be. Any change that may have become necessary in these drawings during the execution of the work shall have to be carried out by the CONTRACTOR to the satisfaction of ENGINEER-IN-CHARGE at no extra cost. Allfinal drawings shall bear the certification stamp as indicated below duly signed by both the CONTRACTOR and ENGINEER-IN-CHARGE.

"Certified true for_____
(Name of Work)

Agreement
No._____

Signed:_____

_____
(CONTRACTOR)
(ENGINEER-IN-CHARGE)

62.3 The DRAWINGS submitted by the CONTRACTOR shall be reviewed by the ENGINEER-IN-CHARGE as far as practicable within 3 (Three) weeks and shall be modified by the CONTRACTOR, if any modifications and/or corrections are required by the ENGINEER-IN-CHARGE. The CONTRACTOR shall incorporate such modifications and/or corrections and submit the final drawings for approval. Any delays arising out of failure by the CONTRACTOR to rectify the drawing in good time shall not alter the Contract Completion Time.

62.4 As built drawings showing all corrections, adjustments etc. shall be furnished by the CONTRACTOR in six copies and one transparent for record purposed to the EMPLOYER.

63 Setting out works:

63.1 The ENGINEER-IN-CHARGE shall furnish the CONTRACTOR with only the four corners of the Works site and a level bench mark and the CONTRACTOR shall set out the Works and shall provide an efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.

63.2 The CONTRACTOR shall provide, fix and be responsible for the maintenance of all stakes, templates, level marks, profiles and other similar things and shall take all necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence of such removal of disturbance should the same take place and for their

efficient and timely reinstatement. The CONTRACTOR shall also be responsible for the maintenance of all existing survey marks, boundary marks, distance marks and center line marks, either existing or supplied and fixed by the CONTRACTOR. The work shall be set out to the satisfaction of the ENGINEER-IN-CHARGE. The approval there of joining with the CONTRACTOR by the ENGINEER- IN-CHARGE in setting out the work, shall not relieve the CONTRACTOR of any of his responsibility.

63.3 Before beginning the Works, the CONTRACTOR shall at his own cost, provide all necessary reference and level posts, pegs, bamboos, flags, ranging rods, strings and other materials for proper layout of the works in accordance with the schemes for bearing marks acceptable to the ENGINEER-IN-CHARGE. The center, longitudinal or face lines and cross lines shall be marked by means of small masonry pillars. Each pillar shall have distinct mark at the centre to enable theodolite to be set over it. No work shall be started until all these points are checked and approved by the ENGINEER-IN-CHARGE in writing but such approval shall not relieve the CONTRACTOR of any of his responsibilities. The CONTRACTOR shall also provide all labour, material and other facilities, as necessary, for the proper checking of layout and inspection of the points during construction.

63.4 Pillars bearing geodetic marks located at the sites of units of WORKS under construction should be protected and fenced by the CONTRACTOR.

63.5 On completion of WORK, the CONTRACTOR must submit the geodetic documents according to which the WORK was carried out.

64 Responsibility for level and alignment:

64.1 The CONTRACTOR shall be entirely and exclusively responsible for the horizontal and vertical alignment, the levels and correctness of every part of the WORK and shall rectify effectively any errors or imperfections therein, such rectifications shall be carried out by the CONTRACTOR, at his own cost, when instructions are issued to that effect by the ENGINEER- IN-CHARGE.

65 Materials to be supplied by contractor:

65.1 The CONTRACTOR shall procure and provide within the VALUE OF CONTRACT the whole of the materials required for the construction including steels, cement and other building materials, tools, tackles, construction plant and equipment for the completion and maintenance of the WORK except the materials which will be issued by the EMPLOYER and shall make his own arrangement for procuring such materials and for the transport thereof. The EMPLOYER may give necessary recommendation to the respective authority if so desired by the CONTRACTOR but assumes no further responsibility of any nature. The EMPLOYER will insist on the procurement of materials which bear ISI stamp and/or which are supplied by reputed suppliers.

65.2 The CONTRACTOR shall properly store all materials either issued to him or brought by him to the SITE to prevent damages due to rain, wind, direct exposure to sun, etc. as also from theft, pilferage, etc. for proper and speedy execution of his works. The CONTRACTOR shall maintain sufficient stocks of all materials required by him.

65.3 No material shall be despatched from the CONTRACTOR's stores before obtaining the approval in writing of the ENGINEER-IN-CHARGE.

66 Stores supplied by the employer:

66.1 If the SPECIFICATION of the WORK provides for the use of any material of special description to be supplied from the EMPLOYER's stores or it is required that the CONTRACTOR shall use certain stores to be provided by the ENGINEER-IN-CHARGE, such materials and stores, and price to be charged there for as hereinafter mentioned being so far as practicable for the convenience of the CONTRACTOR, but not so as in any way to control the meaning or effect of the CONTRACT, the CONTRACTOR shall be bound to purchase and shall be supplied such materials and stores as are from time to time required to be used by him for the purpose of the CONTRACT only. The sums due from the CONTRACTOR for the value of materials supplied by the EMPLOYER will be recovered from the running account bill on the basis of the actual consumption of materials in the works covered and for which the running account bill has been prepared. After the completion of the WORK, however, the CONTRACTOR has to account for the full quantity of materials supplied to him as per relevant clauses in this document.

66.2 The value of the stores/materials as may be supplied to the CONTRACTOR by the EMPLOYER will be debited to the CONTRACTOR's account at the rates shown in the schedule of materials and if they are not entered in the schedule, they will be debited at cost price, which for the purpose of the CONTRACT shall include the cost of carriage and all other expenses whatsoever such as normal storage supervision charges which shall have been incurred in obtaining the same at the EMPLOYER's stores. All materials so supplied to the CONTRACTOR shall remain the absolute property of the EMPLOYER and shall not be removed on any account from the SITE of the WORK, and shall be at all times open for inspection to the ENGINEER-IN-CHARGE. Any such materials remaining unused at the time of the completion or termination of the CONTRACT shall be returned to the EMPLOYER's stores or at a place as directed by the ENGINEER-IN-CHARGE in perfectly good condition at CONTRACTOR's cost.

67 Conditions for issue of materials:

67.1 i) Materials specified as to be issued by the EMPLOYER will be supplied to the CONTRACTOR by the EMPLOYER form his stores. It shall be responsibility of the CONTRACTOR to take delivery of the materials and arrange for its loading, transport and unloading at the SITE of WORK at his own cost. The materials shall be issued between the working hours and as per the rules of the EMPLOYER as framed from time to time.

ii) The CONTRACTOR shall bear all incidental charges for the storage and safe custody of materials at site after these have been issued to him.

iii) Materials specified as to be issued by the EMPLOYER shall be issued in standard sizes as obtained from the manufacturers.

iv) The CONTRACTOR shall construct suitable Godowns at the SITE of WORK for storing the materials safe against damage by rain, dampness, fire, theft etc. He shall also employ necessary watch and ward establishment for the purpose.

v) It shall be duty of the CONTRACTOR to inspect the materials supplied to him at the time of taking delivery and satisfy himself that they are in good condition. After the materials have been delivered by the EMPLOYER, it shall be the responsibility of the CONTRACTOR to keep them in good condition and if the materials are damaged or lost, at any time, they shall be repaired and/or replaced by him at his own cost according to the instructions of the ENGINEER-IN-CHARGE.

vi) The EMPLOYER shall not be liable for delay in supply or non-supply of any materials which the EMPLOYER has undertaken to supply where such failure or delay is due to natural calamities, act of enemies, transport and procurement difficulties and any circumstances beyond the control of the EMPLOYER. In no case, the CONTRACTOR shall be entitled to claim any compensation or loss suffered by him on this account.

vii) It shall be responsibility of the CONTRACTOR to arrange in time all materials required for the WORK other than those to be supplied by the EMPLOYER. If, however, in the opinion of the ENGINEER-IN-CHARGE the execution of the WORK is likely to be delayed due to the CONTRACTOR's inability to make arrangements for supply of materials which normally he has to arrange for, the ENGINEER-IN-CHARGE shall have the right at his own discretion to issue such materials, if available with the EMPLOYER or procure the materials from the market or as elsewhere and the CONTRACTOR will be bound to take such materials at the rates decided by the ENGINEER-IN-CHARGE. This, however, does not in any way absolve the CONTRACTOR from responsibility of making arrangements for the supply of such materials in part or in full, should such a situation occur nor shall this constitute a reason for the delay in the execution of the WORK.

viii) None of the materials supplied to the CONTRACTOR will be utilised by the CONTRACTOR for manufacturing item which can be obtained as supplied from standard manufacturer in finished form.

ix) The CONTRACTOR shall, if desired by the ENGINEER-IN-CHARGE, be required to execute an Indemnity Bond in the prescribed form for safe custody and accounting of all materials issued by the EMPLOYER.

x) The CONTRACTOR shall furnish to the ENGINEER-IN-CHARGE sufficiently in advance a statement showing his requirement of the quantities of the materials to be supplied by the EMPLOYER and the time when the same will be required by him for the works, so as to enable the ENGINEER-IN-CHARGE to make necessary arrangements for procurement and supply of the material.

xi) Account of the materials issued by the EMPLOYER shall be maintained by CONTRACTOR indicating the daily receipt, consumption and balance in hand. This account shall be maintained in a manner prescribed by the ENGINEER-IN-CHARGE along with all connected papers viz. requisitions, issues, etc., and shall be always available for inspection in the CONTRACTOR's office at SITE.

xii) The CONTRACTOR should see that only the required quantities of materials are got issued. The CONTRACTOR shall not be entitled to cartage and incidental charges for returning the surplus materials, if any, to the stores where from they were issued or to the place as directed by the ENGINEER-IN-CHARGE.

xiii) Materials/Equipment(s) supplied by EMPLOYER shall not be utilised for any purpose(s) than issued for.

68 Material procured with assistance of employer/return of surplus:

68.1 Notwithstanding anything contained to the contrary in any or all the clauses of this CONTRACT where any materials for the execution of the CONTRACT are procured with the assistance of the EMPLOYER either by issue from EMPLOYER's stock or purchases made under order or permits or licences issued by Government, the CONTRACTOR shall hold the said materials as trustee for the EMPLOYER and use such materials economically and solely for the purpose of the CONTRACT and not dispose them off without the permission of the EMPLOYER and return, if required by the ENGINEER-IN-CHARGE, shall determine having due regard to the condition of the materials. The price allowed to the CONTRACTOR, however, shall not exceed the amount charged to him excluding the storage charges, if any. The decision of the ENGINEER-IN-CHARGE shall be final and conclusive in such matters. In the event of breach of the aforesaid

condition, the CONTRACTOR shall, in terms of the licences or permits and/or criminal breach of trust, be liable to compensate the EMPLOYER at double rate or any higher rate, in the event of those materials at that time having higher rate or not being available in the market, then any other rate to be determined by the ENGINEER-IN-CHARGE and his decision shall be final and conclusive.

69 Materials obtained from dismantling:

69.1 If the CONTRACTOR in the course of execution of the WORK is called upon to dismantle any part for reasons other than those stipulated in Clauses 74 and 77 hereunder, the materials obtained in the WORK of dismantling etc., will be considered as the EMPLOYER's property and will be disposed off to the best advantage of the EMPLOYER.

70 Articles of value found:

70.1 All gold, silver and other minerals of any description and all precious stones, coins, treasure relics, antiquities and other similar things which shall be found in, under or upon the SITE, shall be the property of the EMPLOYER and the CONTRACTOR shall duly preserve the same to the satisfaction of the ENGINEER-IN-CHARGE and shall from time to time deliver the same to such person or persons indicated by the EMPLOYER.

71 Discrepancies between instructions:

71.1 Should any discrepancy occur between the various instructions furnished to the CONTRACTOR, his agent or staff or any doubt arises as to the meaning of any such instructions or should there be any misunderstanding between the CONTRACTOR's staff and the ENGINEER-IN-CHARGE's staff, the CONTRACTOR shall refer the matter immediately in writing to the ENGINEER-IN-CHARGE whose decision thereon shall be final and conclusive and no claim for losses alleged to have been caused by such discrepancies between instructions, doubts, or misunderstanding shall in any event be admissible.

72 Action where no specification is issued:

72.1 In case of any class of WORK for which there is no SPECIFICATION supplied by the EMPLOYER as mentioned in the Tender Documents such WORK shall be carried out in accordance with Indian Standard Specifications and if the Indian Standard Specifications do not cover the same, the WORK should be carried out as per standard Engineering Practice subject to the approval of the ENGINEER-IN-CHARGE.

73 Inspection of Works:

73.1 The ENGINEER-IN-CHARGE will have full power and authority to inspect the WORK at any time wherever in progress either on the SITE or at the CONTRACTOR's premises/workshops wherever situated, premises/ workshops of any person, firm or corporation where WORK in connection with the CONTRACT may be in hand or where materials are being or are to be supplied, and the CONTRACTOR shall afford or procure for the ENGINEER-IN- CHARGE every facility and assistance to carry out such inspection. The CONTRACTOR shall, at all time during the usual working hours and at all other time at

which reasonable notice of the intention of the ENGINEER-IN-CHARGE or his representative to visit the WORK shall have been given to the CONTRACTOR, either himself be present or receive orders and instructions, or have a responsible agent duly accredited in writing, present for the purpose. Orders given to the CONTRACTOR's agent shall be considered to have the same force as if they had been given to the CONTRACTOR himself. The CONTRACTOR shall give not less than seven days notice in writing to the ENGINEER-IN-CHARGE before covering up or otherwise placing beyond reach of inspection and measurement of any work in order that the same may be inspected and measured. In the event of breach of above the same shall be uncovered at CONTRACTOR's expense for carrying out such measurement or inspection.

73.2 No material shall be despatched from the CONTRACTOR's stores before obtaining the approval in writing of the Engineer-in-Charge.

The CONTRACTOR is to provide at all time during the progress of the WORK and the maintenance period, proper means of access with ladders, gangways etc. and the necessary attendance to move and adopt as directed for inspection or measurements of the WORK by the ENGINEER-IN-CHARGE.

73.3 The CONTRACTOR shall make available to the ENGINEER-IN- CHARGE free of cost all necessary instruments and assistance in checking or setting out of WORK and in the checking of any WORK made by the CONTRACTOR for the purpose of setting out and taking measurements of Work.

74 Tests for quality of Work:

74.1 All workmanship shall be of the respective kinds described in the CONTRACT DOCUMENTS and in accordance with the instructions of the ENGINEER-IN-CHARGE and shall be subjected from time to time to such test at CONTRACTOR's cost as the ENGINEER-IN-CHARGE may direct at the place of manufacture or fabrication or on the site or at all or any such places. The CONTRACTOR shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any workmanship as may be selected and required by the ENGINEER-IN-CHARGE.

74.2 All the tests that will be necessary in connection with the execution of the WORK as decided by the ENGINEER- IN-CHARGE shall be carried out at the field testing laboratory of the EMPLOYER by paying the charges as decided by the EMPLOYER from time to time. In case of non- availability of testing facility with the EMPLOYER, the required test shall be carried out at the cost of CONTRACTOR at Government or any other testing laboratory as directed by ENGINEER-IN-CHARGE.

74.3 If any tests are required to be carried out in conjunction with the WORK or materials or workmanship not supplied by the CONTRACTOR, such tests shall be carried out by the CONTRACTOR as per instructions of

ENGINEER-IN-CHARGE and cost of such tests shall be reimbursed by the EMPLOYER.

75 Samples for approval:

75.1 The CONTRACTOR shall furnish to the ENGINEER-IN CHARGE for approval, when requested or if required by the specifications, adequate samples of all materials and finished to be used in the WORK. Such samples shall be submitted before the WORK is commenced and in ample time to permit tests and examinations thereof. All materials furnished and finishes applied in actual WORK shall be fully equal to the approved samples.

76 Action and compensation in case of bad work:

76.1 If it shall appear to the ENGINEER-IN-CHARGE that any work has been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the CONTRACTOR for the execution of the WORK are unsound, or of a quality inferior to that contracted for, or otherwise not in accordance with the CONTRACT, the CONTRACTOR shall on demand in writing from the ENGINEER-IN-CHARGE or his authorised representative specifying the WORK, materials or articles complained of notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the WORK so specified and provide other proper and suitable materials or articles at his own cost and in the event of failure to do so within the period specified by the ENGINEER-IN-CHARGE in his demand aforesaid, the CONTRACTOR shall be liable to pay compensation at the rate of 1 % (One percent) of the estimated cost of the whole WORK, for every week limited to a maximum of 10% (ten percent) of the value of the whole WORK, while his failure to do so shall continue and in the case of any such failure the ENGINEER-IN-CHARGE may on expiry of notice period rectify or remove and re-execute the WORK or remove and replaced with others, the materials or articles complained of to as the case may be at the risk and expense in all respects of the CONTRACTOR. The decision of the Engineering-in-charge as to any question arising under this clause shall be final and conclusive.

77 Suspension of Works:

77.1 i) Subject to the provisions of sub-para (ii) of this clause, the CONTRACTOR shall, if ordered in writing by the ENGINEER-IN-CHARGE, or his representative, temporarily suspend the WORKS or any part thereof for such written order, proceed with the WORK therein ordered to be suspended until, he shall have received a written order to proceed there with. The CONTRACTOR shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the WORKS aforesaid. An extension of time for completion, corresponding with the delay caused by any such suspension of the WORKS as aforesaid will be granted to the CONTRACTOR should he apply for the same provided that the suspension was not consequent to any default or failure on the part of the CONTRACTOR.

ii) In case of suspensions of entire WORK, ordered in writing by ENGINEER-IN-CHARGE, for a period of more than two months, the CONTRACTOR shall have the option to terminate the CONTRACT.

78 Employer may do part of work:

78.1 Upon failure of the CONTRACTOR to comply with any instructions given in accordance with the provisions of this CONTRACT the EMPLOYER has the alternative right, instead of assuming charge of entire WORK, to place additional labour force, tools, equipments and materials on such parts of the WORK, as the EMPLOYER may designate or also engage another CONTRACTOR to carry out the WORK. In such cases, the EMPLOYER shall deduct from the amount which otherwise might become due to the CONTRACTOR, the cost of such work and material with ten percent (10%) added to cover all departmental charges and should the total amount thereof exceed the amount due to the CONTRACTOR, the CONTRACTOR shall pay the difference to the EMPLOYER.

79 Possession prior to completion:

79.1 The ENGINEER-IN-CHARGE shall have the right to take possession of or use any completed or partially completed WORK or part of the WORK. Such possession or use shall not be deemed to be an acceptance of any work completed in accordance with the CONTRACT agreement. If such prior possession or use by the ENGINEER-IN- CHARGE delays the progress of WORK, equitable adjustment in the time of completion will be made and the CONTRACT agreement shall be deemed to be modified accordingly.

80 Defects Liability Period (Twelve months period of liability from the date of issue of completion certificate):

80.1 The CONTRACTOR shall guarantee the installation/WORK for a period of 12 months from the date of completion of WORK as certified by the ENGINEER-IN-CHARGE which is indicated in the Completion Certificate. Any damage or defect that may arise or lie undiscovered at the time of issue of Completion Certificate, connected in any way with the equipment or materials supplied by him or in the workmanship, shall be rectified or replaced by the CONTRACTOR at his own expense as deemed necessary by the ENGINEER-IN-CHARGE or in default, the ENGINEER-IN-CHARGE may carry out such works by other work and deduct actual cost incurred towards labour, supervision and materials consumables or otherwise plus 100% towards overheads (of which the certificate of ENGINEER-IN-CHARGE shall be final) from any sums that may then be or at any time thereafter, become due to the CONTRACTOR or from his Contract Performance Security, or the proceeds of sale thereof or a sufficient part on thereof.

80.2 If the CONTRACTOR feels that any variation in WORK or in quality of materials or proportions would be beneficial or necessary to fulfil the guarantees called for, he shall bring this to the notice of the ENGINEER- IN-CHARGE in writing.

If during the period of liability any portion of the WORK/equipment, is found defective and is rectified/ replaced, the period of liability for such equipment/ portion

of WORK shall be operative from the date such rectification/ replacement are carried out and Contract Performance Guarantee shall be furnished separately for the extended period of liability for that portion of WORK/ equipment only. Notwithstanding the above provisions the supplier's, guarantees/warantees for the replaced equipment shall also be passed on to the EMPLOYER.

80.3 LIMITATION OF LIABILITY

Notwithstanding anything contrary contained herein, the aggregate total liability of CONTRACTOR under the Agreement or otherwise shall be limited to 100% of Agreement / Contract Value. However, neither party shall be liable to the other party for any indirect and consequential damages, loss of profits or loss of production.

81 Care of works:

81.0 From the commencement to completion of the WORK, the CONTRACTOR shall take full responsibility for the care for all works including all temporary works and in case any damages, loss or injury shall happen to the WORK or to any part thereof or to any temporary works from any cause whatsoever, shall at his own cost repair and make good the same so that at completion the WORK shall be in good order and in conformity in every respects with the requirement of the CONTRACT and the ENGINEER-IN-CHARGE's instructions.

81.1 DEFECTS PRIOR TO TAKING OVER:

If at any time, before the WORK is taken over, the ENGINEER-IN-CHARGE shall:

a) Decide that any works done or materials used by the CONTRACTOR or by any SUB-CONTRACTOR is defective or not in accordance with the CONTRACT, or that the works or any portion thereof are defective, or do not fulfill the requirements of CONTRACT (all such matters being hereinafter, called `Defects' in this clause), and

b) As soon as reasonably practicable, gives to the CONTRACTOR notice in writing of the said decision, specifying particulars of the defects alleged to exist or to have occurred, then the CONTRACTOR shall at his own expenses and with all speed make good the defects so specified.

In case CONTRACTOR shall fail to do so, the EMPLOYER may take, at the cost of the CONTRACTOR, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by the EMPLOYER will be recovered from the amount due to the CONTRACTOR. The decision of the ENGINEER-IN-CHARGE with regard to the amount to be recovered from the CONTRACTOR will be final and binding on the CONTRACTOR. As soon as the WORK has been completed in accordance with the CONTRACT (except in minor respects that do not affect their use for the purpose

for which they are intended and except for maintenance there of provided in clause 80.1 of General Conditions of Contract) and have passed the tests on completion, the ENGINEER-IN-CHARGE shall issue a certificate (hereinafter called Completion Certificate) in which he shall certify the date on which the WORK have been so completed and have passed the said tests and the EMPLOYER shall be deemed to have taken over the WORK on the date so certified. If the WORK has been divided into various groups in the CONTRACT, the EMPLOYER shall be entitled to take over any group or groups before the other or others and there upon the ENGINEER-IN-CHARGE shall issue a Completion Certificate which will, however, be for such group or groups so taken over only. In such an event if the group /section/ part so taken over is related, to the integrated system of the work, not withstanding date of grant of Completion Certificate for group/ section/ part. The period of liability in respect of such group/ section/ part shall extend 12 (twelve) months from the date of completion of WORK.

81.2 DEFECTS AFTER TAKINGOVER:

In order that the CONTRACTOR could obtain a COMPLETION CERTIFICATE he shall make good, with all possible speed, any defect arising from the defective materials supplied by the CONTRACTOR or workmanship or any act or omission of the CONTRACT or that may have been noticed or developed, after the works or groups of the works has been taken over, the period allowed for carrying out such WORK will be normally one month. If any defect be not remedied within a reasonable time, the EMPLOYER may proceed to do the WORK at CONTRACTOR's risk and expense and deduct from the final bill such amount as may be decided by the EMPLOYER.

If by reason of any default on the part of the CONTRACTOR a COMPLETION CERTIFICATE has not been issued in respect of any portion of the WORK within one month after the date fixed by the CONTRACT for the completion of the WORK, the EMPLOYER shall be at liberty to use the WORK or any portion thereof in respect of which a completion certificate has not been issued, provided that the WORK or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completing these works for the issue of Completion Certificate.

82 Guarantee/transfer of guarantee:

82.1 For works like water-proofing, acid and alkali resisting materials, pre-construction soil treatment against termite or any other specialized works etc. the CONTRACTOR shall invariably engage SUB-CONTRACTORS who are specialists in the field and firms of repute and such a SUB-CONTRACTOR shall furnish guarantees for their workmanship to the EMPLOYER, through the CONTRACTOR. In case such a SUB-CONTRACTOR/firm is not prepared to furnish a guarantee to the EMPLOYER, the CONTRACTOR shall give that guarantee to the EMPLOYER directly.

83 Training of employer's personnel:

83.1 The CONTRACTOR undertakes to provide training to Engineering personnel selected and sent by the EMPLOYER at the works of the CONTRACTOR without any cost to the EMPLOYER. The period and the nature of training for the individual personnel shall be agreed upon mutually between the CONTRACTOR and the EMPLOYER. These engineering personnel shall be given special training at the shops, where the equipment will be manufactured and/ or in their collaborator's works and where possible, in any other plant where equipment manufactured by the CONTRACTOR or his collaborators is under installation or test to enable those personnel to become familiar with the equipment being furnished by the CONTRACTOR. EMPLOYER shall bear only the to and fro fare of the said engineering personnel.

84 Replacement of defective parts and materials:

84.1 If during the progress of the WORK, EMPLOYER shall decide and inform in writing to the CONTRACTOR, that the CONTRACTOR has manufactured any plant or part of the plant unsound or imperfect or has furnished plant inferior to the quality specified, the CONTRACTOR on receiving details of such defects or deficiencies shall at his own expenses within 7 (seven) days of his receiving the notice, or otherwise within such time as may be reasonably necessary for making it good, proceed to alter, re-construct or remove such work and furnish fresh equipments upto the standards of the specifications. In case the CONTRACTOR fails to do so, EMPLOYER may on giving the CONTRACTOR 7 (seven) day's notice in writing of his intentions to do so, proceed to remove the portion of the WORK so complained of and at the cost of CONTRACTOR's, perform all such works or furnish all such equipments provided that nothing in the clause shall be deemed to deprive the EMPLOYER of or affect any rights under the CONTRACT, the EMPLOYER may otherwise have in respect of such defects and deficiencies.

84.2 The CONTRACTOR's full and extreme liability under this clause shall be satisfied by the payments to the EMPLOYER of the extra cost, of such replacements procured including erection/installation as provided for in the CONTRACT; such extra cost being the ascertained difference between the price paid by the EMPLOYER for such replacements and the CONTRACT price portion for such defective plants and repayments of any sum paid by the EMPLOYER to the CONTRACTOR in respect of such defective plant. Should the EMPLOYER not so replace the defective plant the CONTRACTOR's extreme liability under this clause shall be limited to the repayment of all such sums paid by the EMPLOYER under the CONTRACT for such defective plant.

85 Indemnity

85.1 If any action is brought before a Court, Tribunal or any other Authority against the Employer or an officer or agent of the EMPLOYER, for the failure, omission or neglect on the part of the CONTRACTOR to perform any acts, matters, covenants or things under the CONTRACT, or damage or injury caused by the alleged omission or negligence on the part of the CONTRACTOR, his agents, representatives or his SUB- CONTRACTOR's, or in

connection with any claim based on lawful demands of SUB-CONTRACTOR's workmen suppliers or employees, the CONTRACTOR, shall in such cases indemnify and keep the EMPLOYER and/or their representatives harmless from all losses, damages, expenses or decrees arising out of such action.

86 Construction aids, equipments, tools & tackles:

86.1 CONTRACTOR shall be solely responsible for making available for executing the WORK, all requisite CONSTRUCTION EQUIPMENTS, Special Aids, Barges, Cranes and the like, all Tools, Tackles and Testing Equipment and Appliances, including imports of such equipment etc. as required. In case of import of the same the rates applicable for levying of Custom Duty on such Equipment, Tools, & Tackles and the duty drawback applicable thereon shall be ascertained by the CONTRACTOR from the concerned authorities of Government of India. It shall be clearly understood that EMPLOYER shall not in any way be responsible for arranging to obtain Custom Clearance and/or payment of any duties and/or duty draw backs etc. for such equipments so imported by the CONTRACTOR and the CONTRACTOR shall be fully responsible for all taxes, duties and documentation with regard to the same. Tenderer in his own interest may contact, for any clarifications in the matter, concerned agencies/Dept./Ministries of Govt. of India. All clarifications so obtained and interpretations thereof shall be solely the responsibility of the CONTRACTOR.

SECTION-VI CERTIFICATES AND PAYMENTS

87 Schedule of rates and payments:

87.1 i) <u>CONTRACTOR'S REMUNERATION:</u>

The price to be paid by the EMPLOYER to CONTRACTOR for the whole of the WORK to be done and for the performance of all the obligations undertaken by the CONTRACTOR under the CONTRACT DOCUMENTS shall be ascertained by the application of the respective Schedule of Rates (the inclusive nature of which is more particularly defined by way of application but not of limitation, with the succeeding sub-clause of this clause) and payment to be made accordingly for the WORK actually executed and approved by the ENGINEER-IN-CHARGE. The sum so ascertained shall (excepting only as and to the extent expressly provided herein) constitute the sole and inclusive remuneration of the CONTRACTOR under the CONTRACT and no further or other payment whatsoever shall be or become due or payable to the CONTRACTOR under the CONTRACT.

ii) SCHEDULE OF RATES TO BE INCLUSIVE:

The prices/rates quoted by the CONTRACTOR shall remain firm till the issue of FINAL CERTIFICATE and shall not be subject to escalation. Schedule of Rates shall be deemed to include and cover all costs, expenses and liabilities of every description and all risks of every kind to be taken in executing, completing and handing over the WORK to the EMPLOYER by the CONTRACTOR. The CONTRACTOR shall be deemed to have known the nature, scope, magnitude and the extent of the WORK and materials required though the CONTRACT DOCUMENT may not fully and precisely furnish them. Tenderer's shall make such provision in the Schedule of Rates as he may consider necessary to cover the cost of such items of WORK and materials as may be reasonable and necessary to complete the WORK. The opinion of the ENGINEER-IN-CHARGE as to the items of WORK which are necessary and reasonable for COMPLETION OF WORK shall be final and binding on the CONTRACTOR, although the same may not be shown on or described specifically in CONTRACT DOCUMENTS.

Generality of this present provision shall not be deemed to cut down or limit in any way because in certain cases it may and in other cases it may not be expressly stated that the CONTRACTOR shall do or perform a work or supply articles or perform services at his own cost or without addition of payment or without extra charge or words to the same effect or that it may be stated or not stated that the same are included in and covered by the Schedule of Rates.

iii) SCHEDULE OF RATES TO COVER CONSTRUCTION EQUIPMENTS, MATERIALS, LABOUR ETC.:

Without in any way limiting the provisions of the preceding sub-clause the Schedule of Rates shall be deemed to include and cover the cost of all construction equipment, temporary WORK (except as provided for herein), pumps, materials, labour, insurance, fuel, consumables, stores and appliances to be supplied by the CONTRACTOR and all other matters in connection with each item in the Schedule of Rates and the execution of the WORK or any portion thereof finished, complete in every respect and maintained as shown or described in the CONTRACT DOCUMENTS or as may be ordered in writing during the continuance of the CONTRACT.

iv) SCHEDULE OF RATES TO COVER ROYALTIES, RENTS AND CLAIMS:

The Schedule of Rates (i.e., VALUE OF CONTRACT) shall be deemed to include and cover the cost of all royalties and fees for the articles and processes,

protected by letters, patent or otherwise incorporated in or used in connection with the WORK, also all royalties, rents and other payments in connection with obtaining materials of whatsoever kind for the WORK and shall include an indemnity to the EMPLOYER which the CONTRACTOR hereby gives against all actions, proceedings, claims, damages, costs and expenses arising from the incorporation in or use on the WORK of any such articles, processes or materials, octroi or other municipal or local Board Charges, if levied on materials, equipment or machineries to be brought to site for use on WORK shall be borne by the CONTRACTOR.

v) SCHEDULE OF RATES TO COVER TAXES AND DUTIES:

No exemption or reduction of Customs Duties, Excise Duties, Sales Tax, Sales Tax on works Contract quay or any port dues, transport charges, stamp duties or Central or State Government or local Body or Municipal Taxes or duties, taxes or charges (from or of any other body), whatsoever, will be granted or obtained, all of which expenses shall be deemed to be included in and covered by the Schedule or Rates. The CONTRACTOR shall also obtain and pay for all permits or other privileges necessary to complete the WORK.

vi) SCHEDULE OF RATES TO COVER RISKS OF DELAY:

The Schedule of Rates shall be deemed to include and cover the risk of all possibilities of delay and interference with the CONTRACTOR's conduct of WORK which occur from any causes including orders of the EMPLOYER in the exercise of his power and on account of extension of time granted due to various reasons and for all other possible or probable causes of delay.

vii) SCHEDULE OF RATES CANNOT BE ALTERED:

For WORK under unit rate basis, no alteration will be allowed in the Schedule of Rates by reason of works or any part of them being modified, altered, extended, diminished or committed. The Schedule of Rates are fully inclusive of rates which have been fixed by the CONTRACTOR and agreed to by the EMPLOYER and cannot be altered.

For lumpsum CONTRACTS, the payment will be made according to the WORK actually carried out, for which purpose an item wise, or work wise Schedule of Rates shall be furnished, suitable for evaluating the value of WORK done and preparing running account bill.
Payment for any additional work which is not covered in the Schedule of Rates, shall only be released on issuance of change order.

88 Procedure for measurement and billing of work in progress:

88.1 BILLING PROCEDURE:

Following procedures shall be adopted for billing of works executed by the CONTRACTOR.

88.1.1 All measurements shall be recorded in sextuplicate on standard measurement sheets supplied by EMPLOYER and submitted to EMPLOYER/CONSULTANT for scrutiny and passing.

88.1.2 EMPLOYER/CONSULTANT shall scrutinise and check the measurements recorded on the sheets and shall certify correctness of the same on the measurement sheets.

88.1.3 ENGINEER-IN-CHARGE shall pass the bills after carrying out the comprehensive checks in accordance with the terms and conditions of the CONTRACTS, within 7 days of submission of the bills, complete in all respects and send the same to the Employer to effect payment to the CONTRACTOR.

88.1.4 IGGL shall make all endeavour to make payments of undisputed amount of the bills submitted based on the joint measurements within 15 (Fifteen) days from the date of certification by the Engineer-in-Charge.

88.1.5 Measurements shall be recorded as per the methods of measurement spelt out in EMPLOYER/CONSULTANT SPECIFICATIONS / CONTRACT DOCUMENT. EMPLOYER/CONSULTANT shall be fully responsible for checking the measurements quantitatively and qualitatively as recorded in the Measurement Books/Bills.

88.1.6 While preparing the final bills overall measurements will not be taken again. Only volume of work executed since the last measured bill alongwith summary of final measurements will be considered for the final bill. However, a detailed check shall be made as to missing measurements and in case there are any missing items or measurements the same shall be recorded.

88.2 SECURED ADVANCE ON MATERIAL:
Unless otherwise provided elsewhere in the tender, no `Secured Advance' on security of materials brought to site for execution of contracted items(s) shall be paid to the Contractor whatsoever.

88.3 DISPUTE IN MODE OF MEASUREMENT:

In case of any dispute as to the mode of measurement not covered by the CONTRACT to be adopted for any item of WORK, mode of measurement as per latest Indian Standard Specifications shall be followed.

88.4 ROUNDING-OFF OF AMOUNTS:

In calculating the amount of each item due to the CONTRACTOR in every certificate prepared for payment, sum of less than 50 paise shall be omitted and the total amount on each certificate shall be rounded off to the nearest rupees, i.e., sum of less than 50 paise shall be omitted and sums of 50 paise and more upto one rupee shall be reckoned as one rupee.

89 Lumpsum in tender:

89.1 The payment against any Lumpsum item shall be made only on completion of that item as per the provision of the CONTRACT after certification by ENGINEER-IN-CHARGE.

90 Running account payments to be regarded as advance:

90.1 All running account payments shall be regarded as payment by way of advance against the final payment only and not as payments for WORK actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due performance of the CONTRACT, or any part thereof, in this respect, or of the accurring of any claim by the CONTRACTOR, nor shall it conclude, determine or affect in any way the powers of the EMPLOYER under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or affect the CONTRACT. The final bill shall be submitted by the CONTRACTOR within one month of the date of physical completion of the WORK, otherwise, the ENGINEER-IN-CHARGE's certificate of the measurement and of total amount payable for the WORK accordingly shall be final and binding on all parties

91 Notice of claims for additional payments:

91.1 Should the CONTRACTOR consider that he is entitled to any extra payment for any extra/additional WORKS or MATERIAL change in original SPECIFICATIONS carried out by him in respect of WORK he shall forthwith give notice in writing to the ENGINEER-IN-CHARGE that he claims extra payment. Such notice shall be given to the ENGINEER-IN-CHARGE upon which CONTRACTOR bases such claims and such notice shall contain full particulars of the nature of such claim with full details of amount claimed. Irrespective of any provision in the CONTRACT to the contrary, the CONTRACTOR must intimate his intention to lodge claim on the EMPLOYER within 10 (ten) days of the commencement of happening of the event and quantify the claim within 30 (thirty) days, failing which the CONTRACTOR will lose his right to claim any compensation/reimbursement/damages etc. or refer the matter to arbitration. Failure on the part of CONTRACTOR to put forward any claim without the necessary particulars as above within the time above specified shall be an absolute waiver thereof. No omission by EMPLOYER to reject any such claim and no delay in dealing therewith shall be waiver by EMPLOYER of any of this rights in respect thereof.

91.2 ENGINEER-IN-CHARGE shall review such claims within a reasonably period of time and cause to discharge these in a manner considered appropriate after due deliberations thereon. However, CONTRACTOR shall be obliged to carry

on with the WORK during the period in which his claims are under consideration by the EMPLOYER, irrespective of the outcome of such claims, where additional payments for WORKS considered extra are justifiable in accordance with the CONTRACT provisions, EMPLOYER shall arrange to release the same in the same manner as for normal WORK payments. Such of the extra works so admitted by EMPLOYER shall be governed by all the terms, conditions, stipulations and specifications as are applicable for the CONTRACT. The rates for extra works shall generally be the unit rates provided for in the CONTRACT. In the event unit rates for extra works so executed are not available as per CONTRACT, payments may either be released on day work basis for which daily/hourly rates for workmen and hourly rates for equipment rental shall apply, or on the unit rate for WORK executed shall be derived by interpolation/ extrapolation of unit rates already existing in the CONTRACT. In all the matters pertaining to applicability of rate and admittance of otherwise of an extra work claim of CONTRACTOR the decision of ENGINEER-IN-CHARGE shall be final and binding.

92 Payment of contractor's bill:

92.1 No payment shall be made for works estimated to costless than Rs.10,000/- till the whole of the work shall have been completed and a certificate of completion given. But in case of works estimated to cost more than Rs.10,000/-, that CONTRACTOR on submitting the bill thereof be entitled to receive a monthly payment proportionate to the part thereof approved and passed by the ENGINEER-IN-CHARGE, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the CONTRACTOR. This payment will be made after making necessary corrections/deductions as stipulated elsewhere in the CONTRACT DOCUMENT for materials, Contract Performance Security, taxes etc.

92.2 Payment due to the CONTRACTOR shall be made by the EMPLOYER by Account Payee cheque forwarding the same to registered office or the notified office of the CONTRACTOR. In no case will EMPLOYER be responsible if the cheque is mislaid or misappropriated by unauthorised person/persons. In all cases, the CONTRACTOR shall present his bill duly pre-receipted on proper revenue stamp payment shall be made in Indian Currency.

92.3 In general payment of final bill shall be made to CONTRACTOR within 60 days of the submission of bill on joint measurements, after completion of all the obligations under the CONTRACT.

93 Receipt for payment:

93.1 Receipt for payment made on account of work when executed by a firm, must be signed by a person holding due power of attorney in this respect on behalf of the CONTRACTOR, except when the CONTRACTOR's are described in their tender as a limited company in which case the receipts must be signed in the name of the company by one of its principal officers or by some other person having authority to give effectual receipt for the company.

94 Completion certificate:

94.1 APPLICATION FOR COMPLETION CERTIFICATE:

When the CONTRACTOR fulfils his obligation under Clause 81.1 he shall be eligible to apply for COMPLETION CERTIFICATE.

The ENGINEER-IN-CHARGE shall normally issue to the CONTRACTOR the COMPLETION CERTIFICATE within one month after receiving any application therefore from the CONTRACTOR after verifying from the completion documents and satisfying himself that the WORK has been completed in accordance with and as set out in the construction and erection drawings, and the CONTRACT DOCUMENTS.

The CONTRACTOR, after obtaining the COMPLETION CERTIFICATE, is eligible to present the final bill for the WORK executed by him under the terms of CONTRACT.

94.2 COMPLETION CERTIFICATE:

Within one month of the completion of the WORK in all respects, the CONTRACTOR shall be furnished with a certificate by the ENGINEER-IN-CHARGE of such completion, but no certificate shall be given nor shall the WORK be deemed to have been executed until all scaffolding, surplus materials and rubbish is cleared off the SITE completely nor until the WORK shall have been measured by the ENGINEER-IN-CHARGE whose measurement shall be binding and conclusive. The WORKS will not be considered as complete and taken over by the EMPLOYER, until all the temporary works, labour and staff colonies are cleared to the satisfaction of the ENGINEER-IN-CHARGE.

If the CONTRACTOR fails to comply with the requirements of this clause on or before the date fixed for the completion of the WORK, the ENGINEER-IN-CHARGE may at the expense of the CONTRACTOR remove such scaffolding, surplus materials and rubbish and dispose off the same as he thinks fit and clean off such dirt as aforesaid, and the CONTRACTOR shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realised by the sale thereof.

94.3 COMPLETION CERTIFICATE DOCUMENTS:

For the purpose of Clause 94.0 the following documents will be deemed to form the completion documents:

i) The technical documents according to which the WORK was carried out.

ii) Six (6) sets of construction drawings showing therein the modification and correction made during the course of execution and signed by the ENGINEER-IN-CHARGE.

iii) COMPLETION CERTIFICATE for `embedded' and `covered' up work.

iv) Certificates of final levels as set out for various works.

v) Certificates of tests performed for various WORKS.

vi) Material appropriation, Statement for the materials issued by the EMPLOYER for the WORK and list of surplus materials returned to the EMPLOYER's store duly supported by necessary documents.

95 Final decision and final certificate:

95.1 Upon expiry of the period of liability and subject to the ENGINEER-IN-CHARGE being satisfied that the WORKS have been duly maintained by the CONTRACTOR during monsoon or such period as herein before provided in Clause 80 & 81 and that the CONTRACTOR has in all respect duly made-up any subsidence and performed all his obligations under the CONTRACT, the ENGINEER-IN- CHARGE shall (without prejudice to the rights of the EMPLOYER to retain the provisions of relevant Clause hereof) otherwise give a certificate herein referred to as the FINAL CERTIFICATE to that effect and the CONTRACTOR shall not be considered to have fulfilled the whole of his obligations under CONTRACT until FINAL CERTIFICATE shall have been given by the ENGINEER-IN- CHARGE notwithstanding any previous entry upon the WORK and taking possession, working or using of the same or any part thereof by the EMPLOYER.

96 Certificate and payments on evidence of completion:

96.1 Except the FINAL CERTIFICATE, no other certificates or payments against a certificate or on general account shall be taken to be an admission by the EMPLOYER of the due performance of the CONTRACT or any part thereof or of occupancy or validity of any claim by the CONTRACTOR.

97 Deductions from the contract price:

97.1 All costs, damages or expenses which EMPLOYER may have paid or incurred, which under the provisions of the CONTRACT, the CONTRACTOR is liable/will be liable, will be claimed by the EMPLOYER. All such claims shall be billed by the EMPLOYER to the CONTRACTOR regularly as and when they fall due. Such claims shall be paid by the CONTRACTOR within 15 (fifteen) days of the receipt of the corresponding bills and if not paid by the CONTRACTOR within the said period, the EMPLOYER may, then, deduct the amount from any moneys due i.e., Contract Performance Security or becoming due to the CONTRACTOR under the CONTRACT or may be recovered by actions of law or otherwise, if the CONTRACTOR fails to satisfy the EMPLOYER of such claims.

SECTION-VII TAXES AND INSURANCE

98 Taxes, Duties, Octroi etc:

98.1 The CONTRACTOR agrees to and does hereby accept full and exclusive liability for the payment of any and all Taxes, Duties, including Excise duty, octroi etc. now or hereafter imposed, increased, modified, all the sales taxes, duties, octrois etc. now in force and hereafter increased, imposed or modified, from time to time in respect of WORKS and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions or annuities

now or hereafter imposed by any Central or State Government authorities which are imposed with respect to or covered by the wages, salaries, or other compensations paid to the persons employed by the CONTRACTOR and the CONTRACTOR shall be responsible for the compliance of all SUB-CONTRACTORS, with all applicable Central, State, Municipal and local law and regulation and requirement of any Central, State or local Government agency or authority. CONTRACTOR further agrees to defend, indemnify and hold EMPLOYER harmless from any liability or penalty which may be imposed by the Central, State or Local authorities by reason or any violation by CONTRACTOR or SUB-CONTRACTOR of such laws, suits or proceedings that may be brought against the EMPLOYER arising under, growing out of, or by reason of the work provided for by this CONTRACT, by third parties, or by Central or State Government authority or any administrative sub-division thereof.

Tax deductions will be made as per the rules and regulations in force in accordance with acts prevailing from time to time.

99 Sales tax/Turnover tax: 99.1 Tenderer should quote all inclusive prices including the liability of GST Turnover Tax whether on the works contract as a whole or in respect of bought out components used by the CONTRACTOR in execution of the CONTRACT. EMPLOYER shall not be responsible for any such liability of the CONTRACTOR in respect of this CONTRACT.

100 Statutory variations 100.1 Tenderer should quote prices inclusive of excise-duty and GST applicable on finished product. Any statutory variations in Excise Duty and sales tax/GST on finished product during the contractual completion period, shall be to the Employer's account for which the Contractor will furnish documentary evidence(s) in support of their claims to IGGL. However, any increase in the rate of these taxes and duties (E.D. and GST.) beyond the contractual completion period shall be to Contractor's account and any decrease shall be passed on to IGGL.

101 Insurance: 101.1 <u>GENERAL</u>

CONTRACTOR shall at his own expense arrange secure and maintain insurance with reputable insurance companies to the satisfaction of the EMPLOYER as follows:

CONTRACTOR at his cost shall arrange, secure and maintain insurance as may be necessary and to its full value for all such amounts to protect the WORKS in progress from time to time and the interest of EMPLOYER against all risks as detailed herein. The form and the limit of such insurance, as defined here in together with the under works thereof in each case should be as acceptable to the EMPLOYER. However, irrespective of work acceptance the responsibility to maintain adequate insurance coverage at all times during the period of CONTRACT shall be that of CONTRACTOR alone. CONTRACTOR's failure in this regard shall not relieve him of any of his responsibilities and obligations under CONTRACT.

Any loss or damage to the equipment, during ocean transportation, port/custom clearance, inland and port handling, inland transportation, storage, erection and commissioning till such time the WORK is taken over by EMPLOYER, shall be to the account of CONTRACTOR. CONTRACTOR shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/or replacement of the parts of the Work damaged or lost. CONTRACTOR shall provide the EMPLOYER with a copy of all insurance policies and documents taken out by him in pursuance of the CONTRACT. Such copies of document shall be submitted to the EMPLOYER immediately upon the CONTRACTOR having taken such insurance coverage. CONTRACTOR shall also inform the EMPLOYER at least 60(Sixty) days in advance regarding the expiry cancellation and/or changes in any of such documents and ensure revalidation/renewal etc., as may be necessary well in time.

Statutory clearances, if any, in respect of foreign supply required for the purpose of replacement of equipment lost in transit and/or during erection, shall be made available by the EMPLOYER. CONTRACTOR shall, however, be responsible for obtaining requisite licences, port clearances and other formalities relating to such import. The risks that are to be covered under the insurance shall include, but not be limited to the loss or damage in handling, transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, war risk (during ocean transportation only) etc. The scope of such insurance shall cover the entire value of supplies of equipments, plants and materials to be imported from time to time.

All costs on account of insurance liabilities covered under CONTRACT will be to CONTRACTOR's account and will be included in VALUE OF CONTRACT. However, the EMPLOYER may from time to time, during the currency of the CONTRACT, ask the CONTRACTOR in writing to limit the insurance coverage risk and in such a case, the parties to the CONTRACT will agree for a mutual settlement, for reduction in VALUE OF CONTRACT to the extent of reduced premium amounts.

CONTRACTOR as far as possible shall cover insurance with Indian Insurance Companies, including marine Insurance during ocean transportation.

i) <u>EMPLOYEES STATE INSURANCE ACT:</u>

The CONTRACTOR agrees to and does hereby accept full and exclusive liability for the compliance with all obligations imposed by the Employee State Insurance Act 1948 and the CONTRACTOR further agrees to defend, indemnify and hold EMPLOYER harmless for any liability or penalty which may be imposed by the Central, State or Local authority by reason of any asserted violation by CONTRACTOR or SUB-CONTRACTOR of the Employees' State Insurance Act, 1948, and also from all claims, suits or

proceeding that may be brought against the EMPLOYER arising under, growing out of or by reasons of the work provided for by this CONTRACTOR, by third parties or by Central or State Government authority or any political sub- division thereof.

The CONTRACTOR agrees to fill in with the Employee's State Insurance Corporation, the Declaration Forms, and all forms which may be required in respect of the CONTRACTOR's or SUB- CONTRACTOR's employees, who are employed in the WORK provided for or those covered by ESI from time to time under the Agreement. The CONTRACTOR shall deduct and secure the agreement of the SUB- CONTRACTOR to deduct the employee's contribution as per the first schedule of the Employee's State Insurance Act from wages and affix the Employees Contribution Card at wages payment intervals. The CONTRACTOR shall remit and secure the agreement of SUB-CONTRACTOR to remit to the State Bank of India, Employee's State Insurance Corporation Account, the Employee's contribution as required by the Act. The CONTRACTOR agrees to maintain all cards and Records as required under the Act in respect of employees and payments and the CONTRACTOR shall secure the agreement of the SUB- CONTRACTOR to maintain such records. Any expenses incurred for the contributions, making contributions or maintaining records shall be to the CONTRACTOR's or SUB-CONTRACTOR's account.

The EMPLOYER shall retain such sum as may be necessary from the total VALUE OF CONTRACT until the CONTRACTOR shall furnish satisfactory proof that all contributions as required by the Employees State Insurance Act, 1948, have been paid. This will be pending on the CONTRACTOR when the ESI Act is extended to the place of work.

ii) <u>WORKMEN COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE:</u>

Insurance shall be effected for all the CONTRACTOR's employees engaged in the performance of this CONTRACT. If any of the work is sublet, the CONTRACTOR shall require the SUB-CONTRACTOR to provide workman's Compensation and employer's liability insurance for the later's employees if such employees are not covered under the CONTRACTOR's Insurance.

iii) <u>ACCIDENT OR INJURY TO WORKMEN:</u>

The EMPLOYER shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the Employment of the CONTRACTOR or any SUB-CONTRACTOR save and except an accident or injury resulting from any act or

default of the EMPLOYER, his agents or servants and the CONTRACTOR shall indemnify and keep indemnified the EMPLOYER against all such damages and compensation (save and except and aforesaid) and against all claims, demands, proceeding, costs, charges and expenses, whatsoever in respect or in relation thereto.

iv) TRANSIT INSURANCE

In respect of all items to be transported by the CONTRACTOR to the SITE of WORK, the cost of transit insurance should be borne by the CONTRACTOR and the quoted price shall be inclusive of this cost.

v) COMPREHENSIVE AUTOMOBILE INSURANCE

This insurance shall be in such a form as to protect the Contractor against all claims for injuries, disability, disease and death to members of public including EMPLOYER's men and damage to the property of others arising from the use of motor vehicles during on or off the `site' operations, irrespective of the Employership of such vehicles.

vi) COMPREHENSIVE GENERAL LIABILITY INSURANCE

a) This insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of member of public or damage to property of others due to any act or omission on the part of the Contractor, his agents, his employees, his representatives and Sub- Contractor's or from riots, strikes and civil commotion.

b) Contractor shall take suitable Group Personal Accident Insurance Cover for taking care of injury, damage or any other risks in respect of his Engineers and other Supervisory staff who are not covered under Employees State Insurance Act.

c) The policy shall cover third party liability. The third party (liability shall cover the loss/ disablement of human life (person not belonging to the Contractor) and also cover the risk of damage to others materials/ equipment/ properties during construction, erection and commissioning at site. The value of third party liability for compensation for loss of human life or partial/full disablement shall be of required statutory value but not less than Rs. 2 lakhs per death, Rs. 1.5 lakhs per full disablement and Rs. 1 lakh per partial disablement and shall nevertheless cover such compensation as may be awarded by Court by Law in India and cover for damage to others equipment/ property as approved by the Purchaser. However, third party risk shall be maximum to Rs. 10(ten) lakhs to death.

d) The Contractor shall also arrange suitable insurance to cover damage, loss, accidents, risks etc., in respect of all his plant, equipments and machinery, erection tools &tackles and all other temporary attachments brought by him at site to execute the work.

e) The Contractor shall take out insurance policy in the joint name of EMPLOYER and Contractor from one or more nationalised insurance company from any branch office at Projectsite.

f) Any such insurance requirements as are hereby established as the minimum policies and coverages which Contractor must secure and keep in force must be complied with, Contrator shall at all times be free to obtain additional or increased coverages at Contractor's soleexpenses.

vii) ANY OTHER INSURANCE REQUIRED UNDER LAW OR REGULATIONS OR BY EMPLOYER:

CONTRACTOR shall also carry and maintain any and all other insurance(s) which he may be required under any law or regulation from time to time without any extra cost to EMPLOYER. He shall also carry and maintain any other insurance which may be required by the EMPLOYER.

102 Damage to Property or to any Person or any Third Party

102.1 i) CONTRACTOR shall be responsible for making good to the satisfaction of the EMPLOYER any loss or any damage to structures and properties belonging to the EMPLOYER or being executed or procured or being procured by the EMPLOYER or of other agencies within in the premises of all the work of the EMPLOYER, if such loss or damage is due to fault and/or the negligence or willful acts or omission of the CONTRACTOR, his employees, agents, representatives or SUB-CONTRACTORs.

ii) The CONTRACTOR shall take sufficient care in moving his plants, equipments and materials from one place to another so that they do not cause any damage to any person or to the property of the EMPLOYER or any third party including overhead and underground cables and in the event of any damage resulting to the property of the EMPLOYER or of a third party during the movement of the aforesaid plant, equipment or materials the cost of such damages including eventual loss of production, operation or services in any plant or establishment as estimated by the EMPLOYER or ascertained or demanded by the third party shall be borne by the CONTRACTOR. Third party liability risk shall be Rupees One lakh for single accident and limited to Rupees Ten lakhs.

iii) The CONTRACTOR shall indemnify and keep the EMPLOYER harmless of all claims for damages to property other than EMPLOYER's property arising

under or by reason of this agreement, if such claims result from the fault and/or negligence or willful acts or omission of the CONTRACTOR, his employees, agents, representative of SUB-CONTRACTOR.

SECTION-VIII LABOUR LAWS

103 Labour laws:

103.1 i) No labour below the age of 18 (eighteen) years shall be employed on the WORK.

ii) The CONTRACTOR shall not pay less than what is provided under law to labourers engaged by him on the WORK.

iii) The CONTRACTOR shall at his expense comply with all labour laws and keep the EMPLOYER indemnified in respect thereof.

iv) The CONTRACTOR shall pay equal wages for men and women in accordance with applicable labour laws.

v) If the CONTRACTOR is covered under the Contract labour (Regulation and Abolition) Act, he shall obtain a licence from licensing authority (i.e. office of the labour commissioner) by payment of necessary prescribed fee and the deposit, if any, before starting the WORK under the CONTRACT. Such fee/deposit shall be borne by the CONTRACTOR.

vi) The CONTRACTOR shall employ labour in sufficient numbers either directly or through SUB-CONTRACTOR's to maintain the required rate of progress and of quality to ensure workmanship of the degree specified in the CONTRACT and to the satisfaction of the ENGINEER-IN-CHARGE.

vii) The CONTRACTOR shall furnish to the ENGINEER-IN- CHARGE the distribution return of the number and description, by trades of the work people employed on the works. The CONTRACTOR shall also submit on the 4th and 19th of every month to the ENGINEER-IN-CHARGE a true statement showing in respect of the second half of the preceding month and the first half of the current month (1) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them and (2) the number of female workers who have been allowed Maternity Benefit as provided in the Maternity Benefit Act 1961 on Rules made thereunder and the amount paid to them.

viii) The CONTRACTOR shall comply with the provisions of the payment of Wage Act 1936, Employee Provident

Fund Act 1952, Minimum Wages Act 1948. Employers Liability Act 1938. Workmen's Compensation Act 1923, Industrial Disputes Act 1947, the Maternity Benefit Act 1961 and Contract Labour Regulation and Abolition Act 1970, Employment of Children Act 1938 or any modifications thereof or any other law relating thereto and rules made thereunder from time to time.

ix) The ENGINEER-IN-CHARGE shall on a report having been made by an Inspecting Officer as defined in Contract Labour (Regulation and Abolition) Act 1970 have the power to deduct from the money due to the CONTRACTOR any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfillment of the Conditions of the Contract for the benefit of workers, non-payment of wages or of deductions made from his or their wages which are not justified by the terms of the Contract or non-observance of the said regulations.

x) The CONTRACTOR shall indemnify the EMPLOYER against any payments to be made under and for the observance of the provisions of the aforesaid Acts without prejudice to his right to obtain indemnity from his SUB-CONTRACTOR's. In the event of the CONTRACTOR committing a default or breach of any of the provisions of the aforesaid Acts as amended from time to time, of furnishing any information or submitting or filling and Form/ Register/ Slip under the provisions of these Acts which is materially incorrect then on the report of the inspecting Officers, the CONTRACTOR shall without prejudice to any other liability pay to the EMPLOYER a sum not exceeding Rs.50.00 as Liquidated Damages for every default, breach or furnishing, making, submitting, filling materially incorrect statementas may be fixed by the ENGINEER-IN-CHARGE and in the event of the CONTRACTOR's default continuing in this respect, the Liquidated Damages may be enhanced to Rs.50.00 per day for each day of default subject to a maximum of one percent of the estimated cost of the WORK put to tender. The ENGINEER-IN-CHARGE shall deduct such amount from bills or Contract Performance Security of the CONTRACTOR and credit the same to the Welfare Fund constitute under these acts. The decision of the ENGINEER-IN-CHARGE in this respect shall be final and binding.

104 Implementation of Apprentices Act, 1961:

104.1 The CONTRACTOR shall comply with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued thereunder from time to time. If he fails to do so, his failure will be a breach of the CONTRACT and the ENGINEER-IN-CHARGE may, at his discretion, cancel the CONTRACT. The CONTRACTOR shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions, of the Act.

105 Contractor to indemnify the Employer:

105.1 i) The CONTRACTOR shall indemnify the EMPLOYER and every member, office and employee of the EMPLOYER, also the ENGINEER-IN-CHARGE and his staff against all actions, proceedings, claims, demands, costs and expenses whatsoever arising out of or in connection with the matters referred to in Clause 102.0 and elsewhere and all actions, proceedings, claims, demands, costs and expenses which may be made against the EMPLOYER for or in respect of or arising out of any failure by the CONTRACTOR in the performance of his obligations under the CONTRACT DOCUMENT. The EMPLOYER shall not be liable for or in respect of or arising out of any failure by the CONTRACTOR in the performance of his obligations under the CONTRACT DOCUMENT. The EMPLOYER shall not be liable for or in respect of any demand or compensation payable by law in respect or in consequence of any accident or injury to any workmen or other person. In the employment of the CONTRACTOR or his SUB-CONTRACTOR the CONTRACTOR shall indemnify and keep indemnified the EMPLOYER against all such damages and compensations and against all claims, damages, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

ii) PAYMENT OF CLAIMS AND DAMAGES:

Should the EMPLOYER have to pay any money in respect of such claims or demands as aforesaid the amount so paid and the costs incurred by the EMPLOYER shall be charged to and paid by the CONTRACTOR and the CONTRACTOR shall not be at liberty to dispute or question the right of the EMPLOYER to make such payments notwithstanding the same, may have been made without the consent or authority or in law or otherwise to the contrary.

iii) In every case in which by virtue of the provisions of Section 12, Sub-section (i) of workmen's compensation Act, 1923 or other applicable provision of Workmen Compensation Act or any other Act, the EMPLOYER is obliged to pay compensation to a workman employed by the CONTRACTOR in execution of the WORK, the EMPLOYER will recover from the CONTRACTOR the amount of the compensation so paid, and without prejudice to the rights of EMPLOYER under Section 12, Sub- section (2) of the said act, EMPLOYER shall be at liberty to recover such amount or any part thereof by deducting it from the Contract Performance Security or from any sum due to the CONTRACTOR whether under this CONTRACT or otherwise. The EMPLOYER shall not be bound to contest any claim made under Section 12, Sub-section (i) of the said act, except on the written request of the CONTRACTOR and upon his giving to the EMPLOYER full security for all costs for which the EMPLOYER might become liable in consequence of contesting such claim.

106 Health and sanitary arrangements for workers:

106.1 In respect of all labour directly or indirectly employed in the WORKS for the performance of the CONTRACTOR's part of this agreement, the CONTRACTOR shall comply with or cause to be complied with all the rules and regulations of the local sanitary and other authorities or as framed by the EMPLOYER from time to time for the protection of health and sanitary arrangements for all workers.

106.2 The CONTRACTOR shall provide in the labour colony all amenities such as electricity, water and other sanitary and health arrangements. The CONTRACTOR shall also provide necessary surface transportation to the place of work and back to the colony for their personnel accommodated in the labour colony.

SECTION-IX APPLICABLE LAWS AND SETTLEMENT OF DISPUTES

107 Arbitration:

107.1 Unless otherwise specified, the matters where decision of the Engineer-in-Charge is deemed to be final and binding as provided in the Agreement and the issues/disputes which cannot be mutually resolved within a reasonable time, all disputes shall be referred to arbitration by Sole Arbitrator.

The Employer [IGGL.] shall suggest a panel of three independent and distinguished persons to the bidder/contractor/supplier/buyer (as the case may be) to select any one among them to act as the Sole Arbitrator.

In the event of failure of the other parties to select the Sole Arbitrator within 30 days from the receipt of the communication suggesting the panel of arbitrators, the right of selection of the sole arbitrator by the other party shall stand forfeited and the EMPLOYER (IGGL) shall have discretion to proceed with the appointment of the Sole Arbitrator. The decision of Employer on the appointment of the sole arbitrator shall be final and binding on the parties.

The award of sole arbitrator shall be final and binding on the parties and unless directed/awarded otherwise by the sole arbitrator, the cost of arbitration proceedings shall be shared equally by the parties. The Arbitration proceedings shall be in English language and venue shall be Guwahati, India.

Subject to the above, the provisions of (Indian) Arbitration & Conciliation ACT 1996 and the Rules framed there under shall be applicable. All matter relating to this contract are subject to the exclusive jurisdiction of the court situated in the Guwahati, Assam, India.

Bidders/suppliers/contractors may please note that the Arbitration & Conciliation Act 1996 was enacted by the

Indian Parliament and is based on United Nations Commission on International Trade Law (UNCITRAL model law), which were prepared after extensive consultation with Arbitral Institutions and centers of International Commercial Arbitration. The United Nations General Assembly vide resolution 31/98 adopted the UNCITRAL Arbitration rules on 15 December 1976.

107.2 FOR THE SETTLEMENT OF DISPUTES BETWEEN GOVERNMENT DEPARTMENT AND ANOTHER AND ONE GOVERNMENT DEPARTMENT AND PUBLIC ENTERPRISE AND ONE PUBLIC ENTERPRISE AND ANOTHER THE ARBITRATION SHALL BE AS FOLLOWS:

"In the event of any dispute or difference between the parties hereto, such dispute or difference shall be resolved amicably by mutual consultation or through the good offices of empowered agencies of the Government. If such resolution is not possible, then, the unresolved dispute or difference shall be referred to arbitration of an arbitrator to be nominated by Secretary, Department of Legal Affairs ("Law Secretary") in terms of the Office Memorandum No.55/3/1/75-CF, dated the 19th December 1975 issued by the Cabinet Secretariat (Department of Cabinet Affairs), as modified from time to time. The Arbitration Act 1940 (10 of 1940) shall not be applicable to the arbitration under this clause. The award of the Arbitrator shall be binding upon parties to the dispute. Provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to Law Secretary whose decision shall bind the parties finally and conclusively.

108 Jurisdiction:

108.1 The CONTRACT shall be governed by and constructed according to the laws in force in INDIA. The CONTRACTOR hereby submits to the jurisdiction of the Courts situated at **GUWAHATI, ASSAM** .for the purposes of disputes, actions and proceedings arising out of the CONTRACT, the courts at **GUWAHATI, ASSAM** only will have the jurisdiction to hear and decide such disputed, actions and proceedings.

SECTION-X SAFETY CODES

109 General:

109.1 CONTRACTOR shall adhere to safe construction practice and guard against hazardous, and unsafe working conditions and shall comply with EMPLOYER's safety rules as set forth herein. Prior to start of construction, CONTRACTOR will be furnished copies of EMPLOYER's "Safety Code" for information and guidance, if it has been prepared.

110 Safety regulations:

110.1 i) In respect of all labour, directly employed in the WORK for the performance of CONTRACTOR's part

of this agreement, the CONTRACTOR shall at his own expense arrange for all the safety provisions as per safety codes of C.P.W.D., Indian Standards Institution. The Electricity Act, The Mines / Factory Act and such other acts as applicable.

ii) The CONTRACTOR shall observe and abide by all fire and safety regulations of the EMPLOYER. Before starting construction work CONTRACTOR shall consult with EMPLOYER's safety Engineers or ENGINEER- IN-CHARGE and must make good to the satisfaction of the EMPLOYER any loss or damage due to fire to any portion of the work done or to be done under this agreement or to any of the EMPLOYER's existing property.

111 First aid and industrial injuries:

111.1 i) CONTRACTOR shall maintain first aid facilities for its employees and those of its SUB-CONTRACTOR.

ii) CONTRACTOR shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Names of those providing the seservices shall be furnished to EMPLOYER prior to start of construction and their telephone numbers shall be prominently posted in CONTRACTOR's field office.

iii) All critical industrial injuries shall be reported promptly to EMPLOYER, and a copy of CONTRACTOR's report covering each personal injury requiring the attention of a physician shall be furnished to the EMPLOYER.

112 General rules:

112.1 Smoking within the battery area, tank farm or dock limits is strictly prohibited. Violators of the no smoking rules shall be discharged immediately.

113 Contractor's barricades:

113.1 i) CONTRACTOR shall erect and maintain barricades required in connection with his operation to guard or protect:-

a) Excavations
b) Hoisting Areas.
c) Areas adjudged hazardous by CONTRACTOR's or EMPLOYER's inspectors.
d) EMPLOYER's existing property subject to damage by CONTRACTOR's Operations.
e) Rail Road unloading spots.

ii) CONTRACTOR's employees and those of his SUB-CONTRACTOR's shall become acquainted with EMPLOYER's barricading practice and shall respect the provisions thereof.

iii) Barricades and hazardous areas adjacent to, but not located in normal routes of travel shall be marked by red flasher lanterns at nights.

114 Scaffolding:

114.1 i) Suitable scaffolding should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is

used an extra Mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying material as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical).

ii) Scaffolding or staging more than 4 metres above the ground or floor, swing suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise retarded at least one metre high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

iii) Working platform, gangway and stairway should be so constructed that they should not sag unduly or unequally and if the height of platform of the gangway or the stairway is more than 4 metres above the ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as in ii) above.

iv) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing of railing whose minimum heights shall be 1 metre.

v) Safe-means of access shall be provided to all working platforms and other working places, every ladder shall be securely fixed. No portable single ladder shall be over 9 metres in length while the width between side rails in rung ladder shall in no case be less than 30 cms for ladder upto and including 3 metres in length. For longer ladder this width should be increased 5mm for each additional foot of length. Uniform steps spacing shall not exceed 30 cms. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed to cause danger or inconvenience to any person or public. The CONTRACTOR shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of defense of every suit, action or other proceeding of law that may be brought by any person for injury sustained owing to neglect of the above precautions and pay any damages and costs which may be awarded in any such suit or action or proceeding to any such person or which may with the consent of the CONTRACTOR be paid to compromise any claim by any such person.

115 Excavation and trenching:

115.1 All trenches 1.2 metres or more in depth, shall at all times be supplied with at least one ladder for each 50 metres length or fraction thereof.

Ladder shall be extended from bottom of the trenches to atleast 1 metre above the surface of the ground. The sides of the trenches which are 1.5M in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 metres of the edge of the trench or half of the trench width whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or under-cutting shall bedone.

116 Demolition/general safety: 116.1 i) Before any demolition work is commenced and also during the progress of the demolition work

a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.

b) No electric cable or apparatus which is liable to be a source of danger shall remain electrically charged.

c) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

ii) All necessary personal safety equipment as considered adequate by the ENGINEER-IN-CHARGE, should be kept available for the use of the persons employed on the SITE and maintained in condition suitable for immediate use, and the CONTRACTOR shall take adequate steps to ensure proper use of equipment by those concerned.

a) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.

b) Those engaged in white washing and mixing or stacking or cement bags or any material which are injurious to the eyes be provided with protective goggles.

c) Those engaged in welding and cutting works shall be provided with protective face & eye shield, hand gloves, etc.

d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

e) When workers are employed in sewers and manholes, which are in use, the CONTRACTOR shall ensure that the manhole covers are opened and are ventilated atleast for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with

suitable railing and provided with warning signals or board to prevent accident to the public.

f) The CONTRACTOR shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken.

1) No paint containing lead or lead product shall be used except in the form of paste or readymade paint.

2) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

3) Overalls shall be supplied by the CONTRACTOR to the workmen and adequate facilities shall be provided to enable the working painters to wash them during and on cessation of Work.

iii) When the work is done near any place where there is risk of drowning, all necessary safety equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

iv) Use of hoisting machines and tackles including their attachments, anchorage and supports shall conform to the following standards or conditions:

a) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defect and shall be kept in good working order.

b) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from patent defects.

c) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding, winch or give signals to the operator.

d) In case of every hoisting machine and of every chain ring hook, shackle, swivel, and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gears referred to above shall be plainly marked with the safe working load of the

conditions under which it is applicable and the same shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond safe working load except for the purpose of testing.

e) In case of departmental machine, the safe working load shall be notified by the ENGINEER-IN-CHARGE. As regards CONTRACTOR's machines, the CONTRACTOR shall notify the safe working load of the machine to the ENGINEER-IN-CHARGE whenever he brings any machinery to SITE of WORK and get it verified by the Engineer concerned.

v) Motors, gears, transmission lines, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as to reduce to minimum the accidental descent of the load, adequate precautions should be taken to reduce the minimum risk of any part or parts of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energised, insulating mats, wearing apparel, such as gloves, sleeves, and boots as may be necessary should be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

vi) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffolds, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of Work.

vii) These safety provisions should be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work-spot. The person responsible for compliance of the safety code shall be named therein by the CONTRACTOR.

viii) To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the CONTRACTOR shall be open to inspection by the Welfare Officer, ENGINEER-IN-CHARGE or safety Engineer of the Administration or their representatives.

ix) Notwithstanding the above clauses there is nothing in these to exempt the CONTRACTOR for the operations of any other Act or rules in force in the Republic of India. The work throughout including any temporary works shall be carried out in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpath at the site or in the vicinity thereto or any existing works whether the property of the Administration or of a third party.

In addition to the above, the CONTRACTOR shall abide by the safety code provision as per C.P.W.D. Safety code and Indian Standard Safety Code from time to time.

117 Care in handling inflammable gas:

117.1 The CONTRACTOR has to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinder/inflammable liquids/paints etc. as required under the law and/or as advised by the fire Authorities of the EMPLOYER.

118 Temporary combustible structures:

118.1 Temporary combustible structures will not be built near or around work site.

119 Precautions against fire:

119.1 The CONTRACTOR will have to provide Fire Extinguishers, Fire Buckets and drums at worksite as recommended by ENGINEER-IN-CHARGE. They will have to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinders/ inflammable liquid/ paints etc. as advised by ENGINEER-IN- CHARGE. Temporary combustible structures will not be built near or around the work-site.

120 Explosives:

120.1 Explosives shall not be stored or used on the WORK or on the SITE by the CONTRACTOR without the permission of the ENGINEER-IN-CHARGE in writing and then only in the manner and to the extent to which such permission is given. When explosives are required for the WORK they will be stored in a special magazine to be provided at the cost of the CONTRACTOR in accordance with the Explosives Rules. The CONTRACTOR shall obtain the necessary licence for the storage and the use of explosives and all operations in which or for which explosives are employed shall be at sole risk and responsibility of the CONTRACTOR and the CONTRACTOR shall indemnify the EMPLOYER against any loss or damage resulting directly or indirectly therefrom.

121 Mines /Factories Act:

121.1 SAFETY CODE: The CONTRACTOR shall at his own expense arrange for the safety provisions as required by the ENGINEER-IN-CHARGE in respect of all labour directly employed for performance of the WORKS and shall provide all facilities in connection therewith. In case the CONTRACTOR fails to make arrangements and provides necessary facilities as aforesaid, the ENGINEER-IN- CHARGE shall be entitled to do so and recover the costs thereof from the CONTRACTOR.

121.2 Failure to comply with Safety Code or the provisions relating to report on accidents and to grant of maternity benefits to female workers shall make the CONTRACTOR liable to pay Company Liquidated Damages an amount not exceeding Rs.50/- for each default or materially incorrect statement. The decision of the ENGINEER-IN-CHARGE in such matters based on reports from the Inspecting Officer or from representatives of ENGINEER-IN-CHARGE shall be final and binding and deductions for recovery of such Liquidated Damages may be made from any amount payable to the CONTRACTOR from all the provisions of

the Mines Act, 1952 / Factory Act 1948 or any statutory modifications or re-enactment thereof the time being in force and any Rules and Regulations made thereunder in respect of all the persons employed by him under this CONTRACT and shall indemnify the EMPLOYER from and against any claim under the Mines Act or the rules and regulations framed thereunder by or on behalf of any persons employed by him or otherwise.

122 Preservation of place:

122.1 The CONTRACTOR shall take requisite precautions and use his best endeavours to prevent any riotous or unlawful behaviour by or amongst his worker and others employed or the works and for the preservation of peace and protection of the inhabitants and security of property in the neighborhood of the WORK. In the event of the EMPLOYER requiring the maintenance of a Special Police Force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the CONTRACTOR and if paid by the EMPLOYER shall be recoverable from the CONTRACTOR.

123 Outbreak of infectious diseases:

123.1 The CONTRACTOR shall remove from his camp such labour and their facilities who refuse protective inoculation and vaccination when called upon to do so by the ENGINEER-IN-CHARGE's representative. Should Cholera, Plague or other infectious diseases break out the CONTRACTOR shall burn the huts, beddings, clothes and other belongings or used by the infected parties and promptly erect new huts on healthy sites as required by the ENGINEER-IN-CHARGE failing which within the time specified in the Engineer's requisition, the work may be done by the EMPLOYER and the cost thereof recovered from the CONTRACTOR.

124 Use of intoxicants:

124.1 The unauthorised sale of spirits or other intoxicants, beverages upon the work in any of the buildings, encampments or tenements owned, occupied by or within the control of the CONTRACTOR or any of his employee is forbidden and the CONTRACTOR shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition. In addition to the above, the CONTRACTOR shall abide by the safety code provision as per C.P.W.D. safety code and Indian Standard Code framed from time to time.

PROFORMA OF INDEMNITY BOND FOR SUPPLY OF MATERIALS BY EMPLOYER

(To be executed on non-judicial stamped paper of appropriate value)

WHEREAS IGGL. (hereinafter referred to as IGGL) which expression shall unless repugnant to the context includes their legal representatives, successors and assigns having their office at 5th floor, Central Mall, Christian Basti, Guwahati,Assam has entered into a CONTRACT with_____(hereinafter referred to as the CONTRACTOR which expression shall unless repugnant to the context include their legal representatives, successors and assigns) for _____ on the terms and conditions as setout, inter-alia, in the CONTRACT No..... Dated..... and various documents forming part thereof hereinafter collectively referred to as the "CONTRACT" which expression shall include all amendments, modifications and/or variations thereto.

AND WHEREAS

i) IGGL has agreed to supply to the CONTRACTOR, equipment, plants and materials (finished, semi-finished and raw) for the purpose of EXECUTION of the said CONTRACT by the CONTRACTOR (the equipment, plants and materials to be supplied by IGGL to the CONTRACTOR, hereinafter for the sake of brevity referred to as the "said materials") and pending execution by the CONTRACTOR of the CONTRACT incorporating the said materials, the said materials shall be under the custody and charge of the CONTRACTOR and shall be kept, stored, altered, worked upon and/or fabricated at the sole risk and expense of the CONTRACTOR.

ii) As a pre-condition to the supply of the said materials by IGGL to the CONTRACTOR, IGGL has required the CONTRACTOR to furnish to IGGL an Indemnity Bond in the manner and upon terms and conditions hereinafter indicated.

NOW, THEREFORE, in consideration of the premises aforesaid the CONTRACTOR hereby irrevocably and unconditionally undertakes to indemnify and keep indemnified IGGL from and against all loss, damage and destruction (inclusive but not limited to any or all loss or damage or destruction to or of the said materials or any item or part thereof by theft, pilferage, fire, flood, storm, tempest, lightning, explosion, storage, chemical or physical action or reaction, binding, warping, exposure, rusting, faulty workmanship, faulty fabrication, or faulty method or technique of fabrication, strike, riot, civil commotion, or other actor omission or commission whatsoever within or beyond the control of the CONTRACTOR, misuse and misappropriation (inclusive but not limited to the misuse or misappropriation by the CONTRACTOR and the Contractor's servants and/or agents) whatsoever to, or of in the said materials or any part of them thereof from the date that the same or relative part of item thereof was supplied to the CONTRACTOR upto and until the date of return to IGGL of the said materials or relative part of item thereof or completed fabricated works(s) incorporating the said material and undertake to pay to IGGL forthwith on demand in writing without protest or demur the value as specified by IGGL of the said material or item or part

thereof, lost, damaged, destroyed, misused and/or misappropriated, as the case may be or, together with IGGL'S costs and expenses (inclusive of but not limited to handling, transportation, cartage, insurance, freight, packing and inspection costs/or expenses upto) and aggregate limit of Rs._____
(Rupees_____
_____Only).

AND THE CONTRACTOR hereby agrees with IGGL that:

i) This Indemnity/Undertaking shall be a continuing Indemnity/ Undertaking and shall remain valid and irrevocable for all claims of IGGL arising hereunder upto and until the midnight of_____. However, if the CONTRACT for which this Indemnity/Undertaking is given is not completed by this date, the CONTRACTOR hereby agrees to extend the Indemnity/Undertaking till such time as is required to fulfil the CONTRACT.

ii) This Indemnity/Undertaking shall not be determined by any change in constitution or upon insolvency of the CONTRACTOR but shall be in all respects and for all purposes be binding and operative until payment of all moneys payable to IGGL in terms of hereof.

iii) The mere statement of allegation made by or on behalf of IGGL in any notice or demand or other writing addressed to the CONTRACTOR as to any of the said material or item or part thereof having been lost , damaged, destroyed, misused or misappropriated while in the custody of the CONTRACTOR and/or prior to completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials shall be conclusive of the factum of the said material or item or part thereof having been supplied to the CONTRACTOR and/or the loss, damage, destruction, misuse or misappropriation thereof, as the case may be, while in the custody of the CONTRACTOR and/or prior to the completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials without necessity on the part of IGGL to produce any documentary proof or other evidence whatsoever in support of this.

iv) The amount stated in any notice of demand addressed by IGGL to the CONTRACTOR as to the value of such said materials lost, damaged, destroyed, misused or misappropriated, inclusive relative to the costs and expenses incurred by IGGL in connection therewith shall be conclusive of the value of such said materials and the said cost and expenses as also of the amount liable to be paid to IGGL to produce any voucher, bill or other documentation or evidence whatsoever in support thereof and such amount shall be paid without any demur and on demand and no dispute shall be raised concerning the same.

The undersigned has full power to execute this Indemnity Bond on behalf of the CONTRACTOR under the Power of Attorney dated _____.

(SIGNED BY COMPETENT AUTHORITY)

Place:

Dated:

Official seal of the CONTRACTOR

PROFORMA FOR CONTRACT AGREEMENT

LOA No. IGGL/ Dated _____

Contract Agreement for the work of _____of IGGL. made on _____ between (Name and Address) _____ , hereinafter called the "CONTRACTOR" (which term shall unless excluded by or repugnant to the subject or context include its successors and permitted assignees) of the one part and IGGL hereinafter called the "EMPLOYER" (which term shall, unless excluded by or repugnant to the subject or context include its successors and assignees) of the other part.

WHEREAS

A. The EMPLOYER being desirous of having provided and executed certain work mentioned, enumerated or referred to in the Tender Documents including Letter Inviting Tender, General Tender Notice, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, Plans, Time Schedule of completion of jobs, Schedule of Rates, Agreed Variations, other documents has called for Tender.

B. The CONTRACTOR has inspected the SITE and surroundings of WORK specified in the Tender Documents and has satisfied himself by careful examination before submitting his tender as to the nature of the surface, strata, soil, sub-soil and ground, the form and nature of site and local conditions, the quantities, nature and magnitude of the work, the availability of labour and materials necessary for the execution of work, the means of access to SITE, the supply of power and water thereto and the accommodation he may require and has made local and independent enquiries and obtained complete information as to the matters and thing referred to, or implied in the tender documents or having any connection therewith and has considered the nature and extent of all probable and possible situations, delays, hindrances or interferences to or with the execution and completion of the work to be carried out under the CONTRACT, and has examined and considered all other matters, conditions and things and probable and possible contingencies, and generally all matters incidental thereto and ancillary thereof affecting the execution and completion of the WORK and which might have influenced him in making his tender.

C. The Tender Documents including the Notice Letter Inviting Tender, General Conditions of Contract, Special Conditions of Contract, Schedule of Rates, General Obligations, SPECIFICATIONS, DRAWINGS, PLANS, Time Schedule for completion of Jobs, Letter of Acceptance of Tender and any statement of agreed variations with its enclosures copies of which are hereto annexed form part of this CONTRACT though separately set out herein and are included in the expression "CONTRACT" wherever herein used.

AND WHEREAS

The EMPLOYER accepted the Tender of the CONTRACTOR for the provision and the execution of the said WORK at the rates stated in the schedule of quantities of the work and finally approved by EMPLOYER (hereinafter called the "Schedule of Rates") upon the terms and subject to the conditions of CONTRACT.

NOW THIS AGREEMENT WITNESSETH AND IT IS HEREBY AGREED AND DECLARED AS FOLLOWS:-

1. In consideration of the payment to be made to the CONTRACTOR for the WORK to be executed by him, the CONTRACTOR hereby covenants with EMPLOYER that the CONTRACTOR shall and will duly provide, execute and complete the said work and shall do and perform all other acts and things in the CONTRACT mentioned or described or which are to be implied there from or may be reasonably necessary for the completion of the said WORK and at the said times and in the manner and subject to the terms and conditions or stipulations mentioned in the contract.

2. In consideration of the due provision execution and completion of the said WORK, EMPLOYER does hereby agree with the CONTRACTOR that the EMPLOYER will pay to the CONTRACTOR the respective amounts for the WORK actually done by him and approved by the EMPLOYER at the Schedule of Rates and such other sum payable to the CONTRACTOR under provision of CONTRACT, such payment to be made at such time in such manner as provided for in the CONTRACT.

A N D

3. In consideration of the due provision, execution and completion of the said WORK the CONTRACTOR does hereby agree to pay such sums as may be due to the EMPLOYER for the services rendered by the EMPLOYER to the CONTRACTOR, such as power supply, water supply and others as set for in the said CONTRACT and such other sums as may become payable to the EMPLOYER towards the controlled items of consumable materials or towards loss, damage to the EMPLOYER'S equipment, materials construction plant and machinery, such payments to be made at such time and in such manner as is provided in the CONTRACT.

   It is specifically and distinctly understood and agreed between the EMPLOYER and the CONTRACTOR that the CONTRACTOR shall have no right, title or interest in the SITE made available by the EMPLOYER for execution of the works or in the building, structures or work executed on the said SITE by the CONTRACTOR or in the goods, articles, materials etc., brought on the said SITE (unless the same specifically belongs to the CONTRACTOR) and the CONTRACTOR shall not have or deemed to have any lien whatsoever charge for unpaid bills will not be entitled to assume or retain possession or control of the SITE or structures and the EMPLOYER shall have an absolute and unfettered right to take full possession of SITE and to remove the CONTRACTOR, their servants, agents and materials belonging to the CONTRACTOR and lying on the SITE.

The CONTRACTOR shall be allowed to enter upon the SITE for execution of the WORK only as a licensee simpliciter and shall not have any claim, right, title or interest in the SITE or the structures erected thereon and the EMPLOYER shall be entitled to terminate such license at any time without assigning any reason.

The materials including sand, gravel, stone, loose, earth, rock etc., dug up or excavated from the said SITE shall, unless otherwise expressly agreed under this CONTRACT, exclusively belong to the EMPLOYER and the CONTRACTOR shall have no right to claim over the same and such excavation and materials should be disposed off on account of the EMPLOYER according to the instruction in writing issued from time to time by the ENGINEER-IN-CHARGE.

In Witness whereof the parties have executed these presents in the day and the year first above written.

Signed and Delivered for and on
on behalf of EMPLOYER.

IGGL

_____

_____

Date:_____

Place:_____

Signed and Delivered for and
on behalf of the CONTRACTORs.

(NAME OF THE CONTRACTOR)

_____

_____

Date:_____

Place:_____

IN PRESENCE OF TWO WITNESSES

1._____

_____

_____

2._____

_____

_____

1. _____

_____

_____

2. _____

_____

_____

SECTION – V

SPECIAL CONDITION OF CONTRACTS

(SCC)

&

ANNEXURES to SCC

SPECIAL CONDITIONS OF CONTRACT

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93.0 E-MEASURMENT

1.0 GENERAL

1.1 Special Conditions of Contract shall be read in Conjunction with the General conditions of Contract, specification of work, Drawings and any other documents forming part of this Contract wherever the context so requires.

1.2 Notwithstanding the sub-division of the documents into these separate sections and volumes, every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the Contract so far as it may be practicable to do so.

1.3 Where any portion of the General Condition of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears, the provisions of the special Conditions of Contract shall be deemed to over-ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.

1.4 Wherever it is mentioned in the specifications that the Contractor shall perform certain work or provide certain facilities, it is understood that the Contractor shall do so at his own cost and the value of contract shall be deemed to have included cost of such performance and provisions, so mentioned.

1.5 The materials, design, and workmanship shall satisfy the relevant Indian Standards, the Job Specifications contained herein and Codes referred to. Where the job specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

1.6 Void

1.7 It will be the Contractor's responsibility to bring to the notice of Engineer-in-Charge any irreconcilable conflict in the contract documents before starting the work (s) or making the supply with reference which the conflict exists.

1.8 In the absence of any Specifications covering any material, design of work (s) the same shall be performed / supplies / executed in accordance with Standard Engineering Practice as per the instructions / directions of the Engineer-in-Charge, which will be binding on the Contractor.

1.9 *In case of any conflict in technical requirements among PJS, TS, SCC, SOR etc. of tender document and international / national codes / standards, more stringent requirement shall govern or as per the decision of EIC.*

2.0 SCOPE OF WORK & SCOPE OF SUPPLY

The scope of work covered in this Contract will be as described in **Annexure-1 to SCC**, Particular job specifications, Standard Specifications, Schedule of Rates etc. The scope of supply covered in this Contract will be as described in **Annexure-2 to**

SCC, Particular Job Specifications, Standard Specifications, Schedule of Rates etc. It is however, explicitly understood that scope described is not limiting, in far as the responsibilities of the contractor are concerned and shall include, inter alia, carrying out any and all works and providing any and all facilities as are required to complete the works in all respect.

3.0 SUPPLY OF WATER, POWER & OTHER UTILITIES

3.1 The Clause No. 2.3 to 2.5 given in General Conditions of Contract is modified to following extent:

3.2 The Contractor shall be responsible at his own cost for arranging and providing all the required Water, Power, land required for temporary site office, fabrication yard and other utilities, in the quantities and at the times required for performance of work under the contract. The contract price shall be deemed to include all costs towards the same.

The Employer/Consultant shall not supply water, power and other utilities.

3.3 Contractor shall, if required by him, for the entire duration of the execution of the work make available near the site, land for construction of Contractor's office, Warehouse, Workshops and for any purpose in connection with providing infrastructure required for the execution of the Contract. The Contractor shall at his own cost construct all temporary buildings and provide suitable water supply and sanitary arrangement as required. On completion of the work undertaken by the Contractor, he shall remove all temporary works erected by him and have the site cleared as directed by Engineer-in-Charge. If the Contractor shall fail to comply with these requirements, the Engineer-in-Charge may at the expense of the Contractor remove such surplus and rubbish materials and dispose off the same as he deems fit and get the site cleared as aforesaid, and the Contractor shall forthwith pay the amount of all expenses so incurred and shall have no claims in respect of any such surplus material disposed of as aforesaid.

3.4 Cutting of trees shall not be permitted except in the case that tree is falling on the line of ROU/ROW. In such circumstances, details of such tree being cut shall be prepared and forest/ municipal authorities be informed and necessary approval be obtained by contractor.

4.0 COMPLETION SCHEDULE / COMPLETION PERIOD

4.1 The work shall be executed strictly as per completion schedule / completion period given in **Annexure-3 to SCC** in the bidding document. The period of completion given includes the time required for mobilization as well as testing, rectifications, if any, retesting and completion in all respects to the entire satisfaction of the Engineer-in-Charge.

4.2 A joint program of execution of work will be prepared by the Engineer-in-Charge and Contractor. This programme will take into account the time of completion mentioned above.

4.3 Monthly/ weekly construction programme will be drawn up by Engineer-in-Charge jointly with the contractor based on availability of work fronts and the joint construction program as above clause. The Contractor shall scrupulously adhere to these Targets/ Program by deploying adequate personnel, construction tools & tackles and shall also supply all materials of his scope of supply in good time to achieve the targets set out in the weekly and monthly program. In all matters concerning the extent of targets set out in the weekly and achievements, the decision of the Engineer-in-Charge shall be final and binding on the contractor.

4.4 If the Contractor fails to achieve the targeted progress schedule of each month as mentioned in the bidding document, the Employer/Consultant at its option, may terminate the contract as contractor's default and get the work completed from other sources at contractor's risk & cost.

4.5 Contractor shall give every day report on category wise labour and equipment deployed along with the progress of work done on previous day in the proforma prescribed by the Engineer-in-Charge.

4.6 The contractor shall submit fortnightly report covering all major activities indicating schedule / actual progress, slippages & its reasons and catch-up plan.

4.7 The Bidder shall also consider local labour/ Trade unionism in the state while quoting. No waiver shall be attributable to the stoppage due to union activities & due to the influence of trade unionism and adverse weather conditions.

5.0 DRAWINGS AND DOCUMENTS

5.1 The drawings accompanying the bid document (if any) are of indicative nature and issued for bidding purpose only. Purpose of these drawing is to enable the bidder to make an offer in line with the requirements of the Employer / Consultant. However, no extra claim whatsoever, shall be entertained for variation in the "Approved for Construction" and "Bid document drawings" regarding any changes/units. Construction shall be as per drawings / specifications issued/approved by the Engineer-in-Charge during the course of execution of work. Detailed construction drawings (wherever required) on the basis of which actual execution of work is to proceed will be prepared by the contractor.

5.2 The drawings and documents to be submitted by the Contractor to Employer/Consultant after award of the work as per the requirements enlisted in the bidding document shall be for Employer/Consultant's review, information and record. The Contractor shall ensure that drawings and documents submitted to Employer/Consultant are accompanied by relevant calculations, data as required and essential for review of the document/ drawings. Consultant shall review the drawings/ documents within two weeks from the date of submission provided the same are accompanied by relevant calculations, data as required and essential for review.

5.3 All documents and drawings including those of Contractors sub-vendor's manufacturer's etc. shall be submitted to Employer/Consultant after having been fully vetted in detail, approved and co-opted by the Contractor & shall bear Contractor seal/ certifications to this effect. All documents/drawings & submissions made to Employer/Consultant without compliance to this requirement will not be acceptable and the delay & liability owing to this shall be to the Contractor's account.

5.4 The review of documents and drawings by Employer/Consultant shall not absolve Contractor from his responsibility to meet the requirements of specifications, drawings etc. and liabilities for mistakes and deviations. Upon receiving the comments on the drawing/documents reviewed by Employer / Consultant, Contractor shall incorporate the comments as required and ensure their compliance.

5.5 Copies of all detailed working drawing relating to the works shall be kept at the contractors' office at the site and shall be made available to the Engineer-in-charge/ Employer/Consultant at any time during execution of the contract. However, no extra claim what so ever shall be entertained for any variation in the "approved/issued for construction drawings" and "tender drawings" regarding any changes/units unless otherwise agreed.

5.6 The Contractor shall rectify any inaccuracies, errors and non-compliance to contractual requirements. Any delay occurring on this shall not construe a reason for delay/ extension.

6.0 COMPLIANCE WITH LAWS

6.1 The Contractor shall abide by all applicable rules, regulations, statutes, laws governing the performance of works in India, including but not limited to the following:

i) Contract Labour (Regulation & Abolition) Act 1970 & the centre rules, 1971 framed there under.
ii) Payment of Wages Act.
iii) Minimum Wages Act.
iv) Employer's Liability Act.
v) Factory Act.
vi) Apprentices Act.
vii) Workman's Compensation Act.
viii) Industrial Dispute Act.
ix) Environment Protection Act.
x) Wild life Act.
xi) Maritime Act.
xii) Any other Statute, Act, Law as may be applicable.
xiii) PNGRB Act.

7.0 GOVERNMENT OF INDIA NOT LIABLE

7.1 It is expressly understood and agreed by and between the Contractor and the Employer/Consultant that the Employer/Consultant is entering into this agreement solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood and agreed that the Government of India is not a party to this agreement and has no liabilities, obligations or rights there under. It is expressly understood and agreed that the Employer/Consultant is an independent legal entity with power and authority to enter into contract, solely in its own behalf under the applicable laws of India and general principal of Contract Law. The Contractor expressly agrees, acknowledges and understands that the Employer/Consultant is not an agent, representative or delegate of Govt. of India. It is further understood and agreed that the Govt. of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the contract. Accordingly, contractor hereby expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Govt. of India arising out of this contract and covenants not to sue to Govt. of India as to any manner, claim, cause of action or thing whatsoever arising of or under this agreement.

8.0 VOID

9.0 LIMITATION OF LIABILITY

9.1 The final payment by the Employer/Consultant in pursuance of the Contract terms shall not mean release of the Contractor from all of his liabilities under the Contract. The Contractor shall be liable and committed under this contract to fulfill all his liabilities and responsibilities, till the time of release of contract performance guarantee by the Employer/Consultant.

9.2 Notwithstanding anything contrary contained herein, the aggregate total liability of Contractor under the Contract or otherwise shall be limited to 100% of Contract value. However, neither party shall be liable to the other party for any indirect and consequential damages, loss of profit or loss of production.

10.0 VOID

11.0 CONTRACT PERFORMANCE SECURITY / SECURITY DEPOSIT

11.1 Please refer clause no. 38 of ITB (Vol I) and clause no. 24.0 of GCC (General Condition of Contract).

11.2 In addition to clause no.38 of ITB and 24 of GCC following will also apply:-

a) In the event completion of works is delayed beyond the Scheduled Completion Date for any reasons whatsoever, the Contractor shall have the validity of the guarantee suitably extended to cover the period mentioned above.

b) The Employer/Consultant shall have an unqualified option under this guarantee to invoke the Banker's Guarantee and claim the amount there under in the event of Contractor failing to honour any of the commitments entered into under this Contract and/or in respect of any amount due from the Contractor to the Employer/Consultant. In case Contractor fails to furnish the requisite Bank Guarantee as stipulated above, then the Employer/Consultant shall have the option to terminate the Notification of Award of Work and forfeit the Bid Security/Earnest Money amount and compensation for the works performed shall be payable upon such termination.

c) Upon completion of the Works as per Completion Schedule stipulated in Contract, the above-mentioned guarantee shall be considered to constitute the Contractor's warranty/guarantee for the work done by him or for the Works supplied and performance as per the specifications and any other conditions against this Contract. The warranty/guarantee shall remain in force for 12 months from the date of commissioning as defined in Annexures to SCC. Contractor shall also arrange for the Performance Guarantee to remain valid until expiration of the guarantee period for entire works covered under the contract.

d) In the event of Completion of Project being delayed beyond the Contractual Completion Date, the Employer/Consultant may without prejudice to any other right or remedy available to the Employer/Consultant, operate the Bank Guarantee to recover the Compensation for delay as per provision of Contract. The Bank Guarantee amount shall thereupon be increased to the original amount, or the Contractor may alternatively submit a fresh Bank Guarantee for the equivalent amount of compensation for delay recovered.

12.0 TAXES, DUTIES AND LEVIES IN INDIA

12.1 The Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes, duties, including GST etc. now in force and hereafter increased, imposed or modified from time to time in respect of works and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions or annuities now or hereafter imposed by any Central or State Government authorities which are imposed with respect to or covered by the wages, salaries, or other compensations paid to the persons employed by the Contractor and the Contractor shall be responsible for the compliance with all obligations and restrictions imposed by the Labour Law or any other law affecting employer-employee relationship and the Contractor further agrees to comply, and to secure the compliance of all subcontractors with all applicable Central, State, Municipal and local law and regulation, and requirement of any central, State or Local Government agency or authority. Contractor further agrees to defend, indemnify and hold Employer/Consultant harmless from any liability or penalty which may be imposed by

the Central, State or Local authorities by reason of any violation by Contractor or Subcontractor of such laws, regulations or requirements and also from all claims, suits or proceedings that may be brought against the Employer / Consultant arising under, growing out of, or by reason of the work provided for by this Contract, by third parties, or by Central or State Government authority or any administrative sub-division thereof. The prices shall also be inclusive of GST as applicable.

12.2 Employer/Consultant shall make from Contractors' bills such tax deductions as are required as per rules and regulations in force from time to time.

12.3 If GST is applicable during site fabrication, the same must be assessed and deemed to be included by the bidder in the quoted prices. The bidder in this regard shall arrange all required formalities.

12.4 Bidder shall take care of all applicable taxes & duties while submitting their prices.

12.5 Any errors of interpretation of applicability of taxes/ duties by Bidders shall be to their account.

13.0 TAXES, DUTIES AND LEVIES IN FOREIGN COUNTRIES

13.1 The Contractor agrees to and does hereby accept full and exclusive liability at is own cost for the payment of any and all taxes, duties and levies etc as are payable to any government, local or statutory authority in any country other than India, as in force on bid due date or as hereafter imposed, increased or modified, and as are payable by Contractor, his agents, sub-contractor and their employees etc. for performance of work under this contract. The Contractor shall be deemed to have been fully informed with respect to all such liabilities and considered the same in his bid, and the contract shall not be varied in any way on this account.

14.0 SUBSEQUENT LEGISLATION

14.1 All duties, taxes, fees, charges, expenses, etc. (except where otherwise expressly provided in the Contract) as may be levied/ imposed in consequence of execution of the works or in relation thereto or in connection therewith as per the Acts, Laws, Rules, Regulations in force shall be to Contractor's account. However, any new taxes /duties imposed after the date of submission of last price bid & up to Contractual Completion date shall be to the IGGL's account but such Taxes /duties imposed beyond Contractual Completion date shall be to the Contractor's account. However, if such new taxes etc. are in substitute of existing taxes, it will be considered on merit of each case.

15.0 VOID

16.0 INCOME TAX & CORPORATE TAX

Please refer clause no. 43 of ITB, Vol I.

17.0 to 20.0 VOID

21.0 WITHHOLDING, ACCOUNTING AND TAX REQUIREMENTS

21.1 Contractor agrees for withholding from wages and salaries of its agents, servants or employees all sums, required to be withheld by the laws of the Republic of India or any other agency having jurisdiction over the area where Contractor is conducting operations, and to pay the same promptly and directly when due to the proper authority. Contractor further agrees to comply with all accounting and reporting requirements of any Nation having jurisdiction over the subject matter hereof and to conform to such laws and regulations and to pay the cost of such compliance. If requested, Contractor will furnish the evidence of payment of applicable taxes, in the country(ies) of the Contractor's and his sub-contractor(s) and expatriate employees.

22.0 INTELLECTUAL PROPERTY

22.1 Neither Employer/Consultant nor Contractor nor their personnel, agents nor any sub-contractor shall divulge to any one (other than persons designated by the party disclosing the information) any information designated in writing as confidential and obtained from the disclosing party during the course of execution of the works so long as and to the extent that the information has not become part of the public domain. This obligation does not apply to information furnished or made known to the recipient of the information without restriction as to its use by third parties or which was in recipient's possession at the time of disclosure by the disclosing party. Upon completion of the works or in the event of termination pursuant to the provisions of the contract, Contractor shall immediately return to Employer/Consultant all drawings, plans, specifications and other documents supplied to the Contractor by or on behalf of Employer/Consultant or prepared by the Contractor solely for the purpose of the performance of the works, including all copies made thereof by the Contractor.

23.0 FIRM PRICE

23.1 The quoted prices shall be firm and shall not subjected to price escalation till the work is completed in all respects.

24.0 WORKS CONTRACT

24.1 The work covered under this contract shall be treated as "Works Contract".

25.0 PROVIDENT FUND ACT

25.1 The Contractor shall strictly comply with the provisions of Employees Provident Fund Act and register themselves with RPFC before commencing work. The Contractor

shall deposit Employees and Employers contributions to the RPFC every month. The Contractor shall furnish along with each running bill, the challan/ receipt for the payment made to the RPFC for the preceding months.

26.0 MOBILIZATION ADVANCE

26.1 Contractor, if requested, shall be paid recoverable interest bearing Mobilization Advance up to a maximum of 10% (Ten Percent) of awarded Contract Value. **The mobilization advance will attract an interest rate (medium term) at Marginal Cost of Fund based Lending Rate (MCLR) for one year charged by SBI (applicable on the date of disbursement of mobilization advance) plus 2% p.a. on reducing balance basis**.

Mobilization Advance shall be paid to the Contractor in two installments after signing the contract agreement and submission of initial security deposit, in the following manner:

26.1.1 FIRST INSTALLMENT

i) 5% (Five percent) of awarded Contract value shall be payable as the first installment of mobilization advance, within 15(fifteen) calendar days, after fulfilling the following formalities by the Contractor:

a) Signing of contract agreement by the Contractor.

b) Submission of a separate bank guarantee towards Contract Performance from a Indian Nationalised/Scheduled Bank/ International Bank as stipulated in Clause no. 71.0 herein in proforma approved by Employer/Consultant towards due performance of contract equivalent to 10% of awarded contract value which shall be kept valid till up to 3 Months after expiry of defect liability period.

c) Submission of a separate Bank Guarantee from a Indian Nationalised /Scheduled Bank/ reputed International Bank as stipulated in Clause no. 71.0 herein in proforma approved by Employer/Consultant equivalent to 11% of awarded contract value **(including GST)** covering mobilization advance which shall be kept valid till **settlement of the mobilization advance along with interest thereon**. However, contractor may submit Bank Guarantee of 11% as above in two stages of 5.5% each for availing advance against sub-clause 26.1.1 & 26.1.2.

d) The Bank Guarantees submitted against mobilization advance shall be released after recovery of mobilization advance along with interest thereon.

26.1.2 SECOND INSTALLMENT

ii) Balance 5% Mobilisation Advance shall be payable to the Contractor after Contractor has constructed site Office, storage shed, fabrication yard etc. and has physically mobilized equipments (as per **Annexure-9B to SCC**) and is ready to start the work to the entire satisfaction of Engineer-in-Charge and commencement of work at site. This installment shall be paid to the contractor after completion of initial mobilization period of minimum thirty days.

26.2 RECOVERY OF MOBILISATION ADVANCE

26.2.1 Recoveries will be effected from each Running Account Bill at the rate of 10% of the gross bill value, till the entire Mobilization Advance (together with interest accrued thereon) is fully recovered. In any case, mobilization advance shall be fully recovered before release of payment due towards Mechanical completion / pre final bill.

26.2.2 Bank Guarantee against mobilization advance shall be released after recovery of Interest and Principal Amount or completion of work whichever is earlier.

27.0 CHANGE ORDERS/ EXTRA WORKS/ DEVIATIONS

27.1 A change order will be initiated in case:

i) The Employer/Consultant directs the Contractor to include any addition to the scope of work not covered under this contract or delete any Section of the scope of the work under the contract.

ii) Contractor requests to delete any part of the work which will not adversely affect the operational capabilities of the project and if agreed by the Employer/Consultant and for which cost and time benefits shall be passed on to the Employer/Consultant.

27.2 Any changes required by the Employer/Consultant before giving their approval to detailed procedure or any other document relating to material procurement, layout plans etc. for complying with the requirements of bidding document shall not be construed to be a change in the scope of work under the contract.

27.3 Any change order as above comprising an alteration which involves a change in the cost of the works (which sort of alteration is hereinafter called a “Variation") shall have impact on the contract value that shall be dealt towards end of contract. All change orders shall be approved by the EIC.

27.4 If the contract provides applicable rates for the valuation of the variation in question the contract price shall be increased or decreased in accordance with those rates. If the parties agree that the contract does not contain applicable rates then the parties

shall negotiate a revision of the contract price which shall represent the change in cost of the works caused by the variations. Any change order must be duly approved by the Employer/Consultant in writing.

27.5 If there is a difference of opinion between Contractor and Employer/Consultant whether a particular work constitutes a change order or not, the matter shall be handled in accordance with the procedures set forth in para 27.7.8 and 27.7.9 here below.

27.6 Within 10 (Ten) working days of receiving the comments from the Employer / Consultant on the documents submitted by the Contractor for approval, the Contractor's response in writing stating which item(s) is/are potential change (s), if applicable, will be submitted to the Employer/Consultant.

27.7 **Procedure**

27.7.1 During execution of work if the Contractor observes that any new requirements which is not specific or intended in the bidding document has been indicated by Employer/Consultant, they shall discuss the matter with Employer/Consultant's representatives.

27.7.2 In case such requirement arises from the side of the Contractor they would also discuss the matter with Employer/Consultant's Representative.

27.7.3 In either of the two cases above, the representatives of both the parties shall discuss the project requirement and mutually decide whether the project requirement constitutes a change order.

27.7.4 If it is mutually agreed that the project requirement/Inquiry constitutes a "Change Order" then a joint memorandum will be prepared to confirm a "Change Order" and basic ideas of necessary agreed modifications.

27.7.5 Contractor will study the work required in accordance with the Joint memorandum and assess subsequent schedule and cost effect if any.

27.7.6 The results of this study would be discussed mutually to enable Employer / Consultant to give a final decision whether Contractor should proceed with the Change Order or not, in the best interest of the Project.

27.7.7 If Employer/Consultant's representative accepts the change order in writing then Contractor shall proceed with the work stipulated in the Change order. Time worked by all workmen employed and a statement showing the description and quantity of all materials and plant utilised for extra work shall be submitted to Employer/Consultant. The Employer/Consultant's representative shall sign and return to the Contractor the statement, as agreed. At the end of each month the Contractor shall deliver to the Employer/Consultant's representative a priced statement of the labour, materials and plant used. Whenever any dispute arises as to cost allocation between the

Contractor and the Employer/Consultant, the voucher shall nevertheless be signed by the Employer/Consultant as a record of time worked and materials used. List and vouchers so signed will be the subject of negotiations between the Employer/Consultant and the Contractor regarding their cost allocation.

27.7.8 In case, mutual agreement as above that is whether Project Requirement constitutes a Change order or not, is not reached, then Contractor, in the interest of the project, shall take up the implementation of the work, if advised in writing to do so by Employer/Consultant's representative pending settlement between the two parties to the effect whether the Project Requirement constitutes a change order or not as per the terms and conditions of Contract Documents.

27.7.9 The time and cost effect in such a case shall be mutually verified for the purpose of record. Should it be established that the said work is constituting a Change Order, the same shall be compensated taking into account the records kept and in accordance with the contract.

27.7.10 Should the amount of Extra Work/ Change Order, if any, which the Contractor may be required to perform by the Employer/Consultant, fairly entitles the Contractor to extensions of time beyond the scheduled completion date for completion of either the whole of the works or for such Extra Work only, the Employer/Consultant and the Contractor shall mutually discuss and decide the extension of time, if any to be granted to the Contractor.

28.0 CONSTRUCTION RIGHT-OF-USE AND PERMITS:

28.1

A. Company will acquire the ROU free of any encroachments/ temporary/permanent structures under P&MP act in general. Acquiring of ROU means publishing of 3(1), 6(1) and 6(4) Gazette notification/publication under P&MP act 1962, wherever applicable. Therefore, handing over of 6(1) gazette notifications for fresh ROU and 6(4) gazette notifications for earlier ROU (as applicable) shall mean handing over of ROU to the Contractor for opening of ROU. Contractor shall carry out Panchnama and open the ROU with revenue team of competent authority appointed by IGGL and start the construction activities.

B. Necessary permission from the respective authorities will be obtained and front will be handed over progressively to the contractor, wherever 3(1)/6(1) publication under PMP Act 1962 is not applicable. However, contractor will deploy manpower for liasioning for expeditious permission and hindrance-free working at site. The brief scope for site clearance and liaising shall be but not limited to the following: - Communication and meeting with respective authorities at the instruction of IGGL for permissions. - Liaising and Co-coordinating with all relevant authorities for ensuring

hindrance pipeline laying works. - Liasioning and co-ordinating with other agencies involved in roadwork deployed by NHAI/PWD etc. - Dedicated Experienced Controlling / Liaison in charge with dedicated Liaising team with all requisite resources for independent movement, having thorough knowledge of local language shall be deputed for each spread. - Separate Liaising team member should be present at each location of pipe execution work so that work does not get hampered due to the communication gap with authorities / agencies / persons. - Contractor's responsibility shall be to ensure hindrance free ROU and should be able to lay the pipeline, complete the laying works including pre-commissioning and commissioning activities, restoration and arrange subsequent visits and post laying inspection or repairs, if any, for entire scope of laying works till the handing over of the pipeline to client.

C. During field measurement if any anomaly on legality of the published 6(1), 6(4) is observed in certain plot(s)/Survey nos., i.e., rightfully not acquired as per the P&MP Act-1962 then that portion of the ROU shall not be considered acquired ROU and will be deducted from the ROU handed over to Contractor.

D. All the awards declared by the Competent Authority will be binding to the Land owners except when such dispute(s) is/are

1. Revised subsequently by the Competent authority himself due to various reasons deem to do so. Hence the period or time lapse between the dispute raised and the revision effected shall not be accountable to the Contractor and then this portion of the ROU shall not be considered acquired ROU and will be deducted from the ROU handed over to Contractor.

2. If any dispute upheld by the District court and stay order is passed, then the period or time lapse between the dispute raised till the stay order is dismissed shall not be accountable to the Contractor and then this portion of the ROU shall not be considered acquired ROU and will be deducted from the ROU handed over to Contractor.

E. If any intervention from State Administration in any section of the ROU where work had to be stopped due to intervention from State Administration shall not be accountable to the Contractor and then this portion of the ROU shall not be considered acquired ROU and will be deducted from the ROU handed over to Contractor.

F. Removal of all the hindrances in the ROU shall be sole responsibility of the contractor except due to reasons as in A to E as above, not accountable to Contractor.

28.1.1 Opening of ROU to start construction works and related activities, management & maintaining of ROU during entire period of execution through necessary liaison & coordination with local people / farmers / authorities for ensuring hindrance-free

construction works at site shall be the responsibility of contractor. In case any obstruction by landowner(s)/farmers/villagers or encroachments or structures are encountered during execution, same shall be got removed by the contractor or local detouring of pipeline shall be carried out. All costs towards such activities shall be to Contractor's account. Compensations rightfully due and applicable as per provisions of the P&MP act shall be paid by COMPANY.

28.2 For pipeline construction purposes, ROU of varying width shall be made available depending upon site condition. ***ROU of 20-meter width*** shall normally be made available to Contractor to the extent feasible for the areas where ROU is acquired under PMP Act 1962. Pipeline shall be laid on one side of boundary of ROU as advised by Engineer-in-Charge.

In Forest areas, hilly terrain and congested areas such as built-up areas, along roads (Where Right of Way- ROW will be obtained from the authority) etc., restricted ROU of 10 meter or less shall be available. The pipeline shall be laid at 2 m from the ROU edge in reserve forest areas. All these eventualities shall be taken into account. It shall be Contractor's responsibility to make arrangement for any additional land required for fabrication, construction, storage and all other work areas.

To minimize fresh land acquisition and associated disturbances, substantial portions of the alignment are proposed within the existing Right of Use (RoU) corridors of BCPL, ONGC and few portion of existing NEGG network pipeline, while the remaining sections require acquisition of fresh RoU. It may be noted that only about 39.3 Km ROU is fresh ROU. Rest of the pipeline shall be laid for 75.948km in the existing shared ROU of BCPL, 52.942 km in existing shared ROU of ONGC, and 6.556 km in existing shared ROU of other IGGL pipelines. Approved Standard Operating Procedure (SOP) as well as all the conditions specified by the existing ROU entity to be followed without any cost implication for laying of pipeline in the shared ROU.

28.3 Contractor shall carry out construction work within the width as made available to him. Where the pipeline route passes through forest/ plantation areas contractor shall clear only the minimum width required for laying the pipeline as per Company's approved procedure for pipeline construction. Felling of trees/plants shall be minimized. Damage to any obstruction, temporary/permanent structure, boundary walls etc. within ROU shall be repaired and restored and cost of repairs/restoration shall be to Contractor's account. Contractor shall arrange for additional working space as required for the purpose of pipeline construction at his own cost & time.

28.4 The Contractor must ensure that during laying of the pipeline minimum damage occurs to the land. The land has to be restored to original condition. All construction activities shall be in accordance with the local Government regulations and shall be performed by the competent and qualified persons for providing adequate protection to the general public, livestock, wild life, forest, power lines, buildings etc. in the

vicinity of the pipeline.

28.5 During pipeline construction, measures shall be adopted in order to minimize the impact of pipeline construction activities on the environment. During ROU clearance, the vegetation shall be cut off at ground level leaving the roots intact. Only stumps and roots directly over the trench shall be removed for pipeline Installation.

28.6 In case of any detour from the acquired ROU due to constructability problems or otherwise, contractor may be permitted to do so after approval from CA / Company. All statutory payments shall be paid/ reimbursed by Company. However, such activity shall not affect the construction schedule and overall completion period.

28.7 Clean-up and restoration of ROU and other conveniences like road, rail, canals, cultivable land, water facilities, irrigation facilities, boundary wall/fence etc. to original condition as per specification and drawings to the entire satisfaction of Company and/or Landowner/Cultivator/ Authorities having jurisdiction over the same, including disposal of surplus excavated soil and other construction materials to a location identified by Contractor approved by local authority without causing any disturbance to environment and to the entire satisfaction of Company.

28.8 Contractor shall arrange necessary clearance from the concerned authorities/land owners to the effect that ROU has been restored back to original condition. Contractor shall carry out joint survey with representative of Competent Authority (CA) and will obtain clearance in writing from CA that ROU has been restored to original condition. / Obtaining NOC for restoring the ROU to original condition shall be in Contractor's scope. However, if the land owner(s) of the affected ROU does not give the NOC, payment may be released to the contractor if the restoration is done physically and to the satisfaction of Owner / Consultant / CA and is certified & accepted by Engineer-in-charge as per the tender specifications. Necessary Proof of restoration, i.e., through photographs and video recordings will have to be submitted by the contractor wherever NOC is not available.

Contractor shall arrange necessary clearance from the concerned authorities to the effect that ROU/ROW has been restored back to original condition.

28.9 Local state Government may impose Taxes/ Duties/ royalty etc towards the excavation and filling of earth for the pipe line and terminals works. It is the responsibility of contractor to make such payments without any cost implications to IGGL.

28.10 Contractor is required to maintain a hindrance register. All hindrances encountered in the execution needs to be logged in this register and shall be jointly signed by Contractor and PMC/IGGL.

28.11 ROU shall be opened in stretches and may not be continuous. In such an event contractor shall skip the section and jump over to next stretch where ROU is

available, without any cost & time implication to the Company.

29.0 CONSTRUCTION EQUIPMENT AND ORGANIZATION

29.1 CONSTRUCTION EQUIPMENT

29.1.1 VOID

29.1.2 The complete list of minimum equipments required to be Owned /Hired/ leased equipments along with MOU from the owner to be submitted by the bidder along with the bid are mentioned in **Annexure 9B to SCC**. Bidder shall also submit their compliance for deployment of equipments as above along with the bid.

29.1.3 Based on availability of ROU / front & line pipe, Contractor shall propose minimum equipment to be deployed and the same shall be finalized by construction-in-charge of IGGL/ PMC on monthly/quarterly basis. Further, Bidder shall be required to augment the above list with additional numbers/categories of equipments, tools, tackles, as required and directed by Engineer-In charge to complete the work within the completion time schedule and quoted price.

29.1.4 The Employer/Consultant shall not supply any Construction Equipment.

29.2 MANPOWER DEPLOYMENT

29.2.1 The complete list of minimum skilled manpower to be deployed are mentioned in **Annexure 10 to SCC.** Bidder shall submit their compliance for deployment of manpower along with the bid.

Qualification and Experience of key construction personnel shall be as per **Annexure-10A to SCC**.

Non deployment or unilateral withdrawal of key personnel by the contractor will attract recovery as per the hiring / recovery rates specified in Annexure-11 to SCC.

29.3 **Schedule of Labour & Equipment Rates**

Hiring / Recovery Rate for Deployment of Manpower attached as **Annexure-11 to SCC** shall be used for analyzing rates for extra items and recovery for non-deployment of key personnel.

Equipment Hiring / Recovery Rates attached as **Annexure-12 to SCC** shall be used for analysing rates for extra items and recovery for non-deployment of Equipment.

30.0 MECHANISED CONSTRUCTION

30.1 Contractor shall without prejudice to his overall responsibility to execute and

complete the work as per specifications and time schedule adopt as far as practicable, mechanized construction techniques for major site activities. Contractor agrees that he will deploy the required numbers and types of the plant & machinery applicable for different activities in consultation with the Engineer-in-charge during execution of works.

30.2 Contractor further agrees that Contract price is inclusive of all the associated costs, which he may incur for actual mobilization, required in respect of use of mechanised construction techniques and that the Employer / Consultant / Consultant in this regard shall entertain no claim whatsoever.

31.0 GENERAL GUIDELINES DURING AND BEFORE ERECTION

31.1 Contractor shall be responsible for organizing the lifting of the equipment in the proper sequence, that orderly progress of the work is ensured and access routes for erecting the other equipments are kept open.

31.2 Orientation of all foundation, elevations, lengths and disposition of anchor bolts and diameter of holes in the support's saddles shall be checked by contractor, well in advance. Minor rectifications including chipping of foundations as the case may be shall be carried out at no extra cost by the contractor after obtaining prior approval of the Engineer-in-Charge. The Contractor shall also be provided with the necessary structural drawings and piping layouts etc., wherever required for reference. During the structural member need to be dismantled, to facilitate the equipment erection, same shall be done by the contractor after ensuring proper stability of main structure with prior permission of Engineer-in-Charge. All such dismantled members shall be put in position back after the completion of equipment erection to satisfaction of Engineer-in-Charge.

31.3 During the performance of the work the Contractor at his own cost, shall keep structures, materials and equipment adequately braced by guys, struts or otherwise approved means which shall be supplied and installed by the Contractor as required till the installation work is satisfactorily completed. Such guys, shoring, bracing, strutting, planking supports etc. shall not interfere with the work of other agencies and shall not damage or cause distortion to other works executed by him or other agencies.

31.4 Manufacturer's recommendations and detailed specifications for the installation of the various equipment and machines will be passed on to the contractor to the extent available during the performance of work. The requirements stipulated in these clauses shall be fulfilled by the Contractor.

31.5 Various tolerances required as marked on the drawings and as per specifications and instructions of the Engineer-in-Charge, shall be maintained. Verticality shall be maintained. Verticality shall be verified with the Theodolite.

31.6 ERECTION OF EQUIPMENTS

31.6.1 All the erection shall be carried out by Cranes of suitable capacity. Erection by derrick shall not be permissible. The contractor shall arrange the crane of suitable capacity required for erection and include cost for same in respective items without any liability on the part of Employer/Consultant.

31.6.2 Bidder shall submit the indicative erection scheme for compressor/equipment and shall undertake the erection only after obtaining approval of erection scheme by Engineer-in-charge.

31.6.3 Grouting of equipments, anchor bolts, pockets and under base plates shall be carried out as per technical specifications.

32.0 PRICE ADJUSTMENT DUE TO NON ACHIEVEMENT OF CONSTRUCTION ASKING RATE AND DELAYED MOBILISATION OR SHORTFALL IN DEPLOYMENT OF KEY PERSONNEL

32.1 CONTRACTOR has to mobilize required equipment & manpower to maintain the minimum construction progress as per asking rate (Km/ Month) for the pipeline section mentioned hereunder. The nos. of equipment mentioned are only indicative and there shall be no recovery/ bonus on account of less/ more deployment of equipment. The CONTRACTOR may have to deploy additional equipments to meet the desired progress without any commercial implications to the client. However, notwithstanding anything else mentioned elsewhere in the tender, the CONTRACTOR must meet the **Asking rate of 25 Km/ month** for lowering.

If the Contractor fails to achieve the required asking rate, the EIC shall issue three notices. If performance does not improve thereafter, the Owner/Consultant may engage an any other agency to achieve the required asking rate, and the actual cost incurred, along with 10% overheads, shall be recovered from the Contractor.

32.2 Construction progress (Asking rate) mentioned above is for lowering of buried pipeline. In case the CONTRACTOR fails to achieve the asking rate, then penalty amount as mentioned below shall be retained from the running account bills of the CONTRACTOR. In this context decision of EIC shall be final and binding to the CONTRACTOR. Following shall remain applicable if CONTRACTOR fails to achieve asking rate in the pipeline section as per clause no. 32.1:

MONTHLY CONSTRUCTION PROGRESS	RETENTION OF AMOUNT FROM CONTRACTOR'S RA BILLS
< 35% of asking rate	@ 0.15% of 80% of total contract value
≥ 35% and < 80% of asking rate	@ 0.1% of 80% of total contract value

≥ 80% of asking rate	No retention

32.3 For the purpose of calculation of retention amount, date of FOA shall be considered as the base date and duration of month shall be considered as 30 days (avg.).

32.4 There shall be no retention on account of asking rate for first month from date of FOA.

32.5 The asking rate retentions shall be only applicable during the original contractual completion period.

32.6 For the purpose of calculation of retention, ROU handed over upto 1 month prior shall be taken into consideration.

32.7 These retentions shall be calculated every month; however, retentions shall be done in RA bills based upon quarterly reconciled calculations jointly signed by CONTRACTOR, MECON and IGGL.

32.8 In case monthly progress is more than 35% of asking rate, then no retention shall be done for first 2 months of each quarter. However, if at the end of each quarter the progress is less than 80% of the cumulative progress required for the quarter, then retentions at the rate as defined in clause no. 32.2 above shall be retained for each month of the quarter from the RA bill of the CONTRACTOR.

32.9 In case the ROU released 1 month prior is less than the cumulative progress required from the CONTRACTOR, then the target progress shall be calculated on pro-rata basis and accordingly retentions will be calculated.

32.10 In case the CONTRACTOR achieves the contractual completion period for mechanical completion of the pipeline, the already deducted amount against deductions on account of failure to meet the asking rate shall be refunded in the final bill. However, in case the CONTRACTOR fails to achieve the contractual completion period for mechanical completion of the pipeline, the already deducted amount shall not be refunded.

32.11 Deduction under this clause shall be in addition to PRS applicable pursuant to GCC clause 27.0 and SCC Clause. The provision of GCC clause no. 27.0 shall have no bearing on this clause.

32.12 In case CONTRACTOR achieves more than the asking rate in each month, then the CONTRACTOR shall not be entitled to any bonus/ extra claim.

32.13 In case work front is not available during the month, a joint record between IGGL/ MECON & CONTRACTOR shall be prepared and the record shall be accounted for in QCR based on which applicability of retention shall be decided.

32.14 Quarterly closure report clearly mentioning the ROU handed over, progress achieved, constraints, extra items/ claims etc. shall be prepared and jointly signed by CONTRACTOR, MECON and IGGL, failing which the RA bills of the CONTRACTOR shall not be processed.

32.15 In case of delay in mobilization or shortfall in deployment of key personnel, recovery shall be affected from contractor's running bills as certified by Engineer-in charge. The recovery shall be for the delayed period / shortfall beyond but not including the permissible mobilization period / month based on the hiring / recovery rates specified elsewhere in the bidding document.

In case time extension is granted without application of Price Reduction Schedule (PRS), then amount deducted on account of key personnel will be refunded to the contractor.

32A.0 **SCHEDULE FOR SUBMISSION OF DOCUMENTS**

Schedule for submission of documents is enclosed in the bid document. In case of delay of more than 30 days from the mentioned schedule, retention shall be applied at the rate of INR 10,000 per Procedure/ Drawing/ QAP (as applicable) limiting to maximum **INR 15.0** Lacs. In case the Contractor achieves the contractual completion period for commissioning of the pipeline, the already retained amount on account of delay in submission of documents shall be refunded.

32B.0 Videography & photography for Phase-1 (before start of construction activities) shall be submitted along with first RA Bill. Final videography & photography (after restoration) shall be submitted along with the final R.A. bill. In case of non-submission of the same, IGGL reserves right to deduct/retain money equivalent to 0.1% of total contract value from the Contractor's RA bills. Further, Videography & Photography of all major activities/ milestones achieved shall also be submitted with each RA bill. IGGL reserves right to hold part or complete amount of RA bill until Videography & Photography of all major activities/ milestones achieved is submitted by Contractor.

33.0 MEASUREMENT OF WORKS

33.1 In addition to the provisions of relevant clause of GCC and associated provisions thereof, the provisions of **Annexure-4 to SCC** shall also apply.

34.0 TERMS OF PAYMENT

34.1 Basis and terms of payment for making "On Account Payment" shall be as set out in **Annexure-5 to SCC**.

35.0 REPAIR OF PIPE DEFECTS

35.1 Immediately prior to aligning pipe for welding, the bevelled ends of each joint of pipe

and the area immediately adjacent thereto (at least 25mm from the edge on the inside and outside of the pipe) shall be thoroughly cleaned of paint, rust, mill scale, dirty or other foreign matter by use of power drive wire buffing wheels, disc sanders, or by other methods approved by Employer/Consultant. This shall be done at no extra cost to Employer/Consultant.

35.2 All damaged ends of pipe that are bent, cut or otherwise mutilated to such an extent that in the opinion of the Employer/Consultant, faulty alignment or unacceptable welding would result, shall be repaired or cut-off and rebevelled to the correct angle with a bevelling machine of a type approved by Employer/Consultant. No compensation shall be allowed by reason of such recutting or bevelling, except when required because of the original bevel being damaged before the pipe is "taken over" by Contractor.

35.3 Dents in bevels with a depth of less than 1 mm shall be removed by Contractor during cleaning and grinding, ahead of the welding in the field. Contractor shall rebevel dented bevel ends with a depth between 1- and 3-mm. Dents over 3mm depth shall be repaired by cutting and rebevelling.

36.0 ISSUE OF EMPLOYER/CONSULTANT SUPPLIED MATERIAL

36.1 The conditions for issue of material and reconciliation refer enclosed **Annexure-8 to SCC.**

36.2 The reconciliation of material shall be applicable only for the material issued by Employer/Consultant as free issue to the contractor.

37.0 LOCATION OF DUMPYARD / WAREHOUSE / STORAGE YARD

37.1 The Dumpyard / Warehouse / Storage Yard is situated at the locations as mentioned in the scope of work.

37.2 The Contractor shall collect the line pipes from the above dump yard(s) and arrange handling of pipes including crane etc. for unloading, transportation of pipes to required location or pipeline ROU shall be the responsibility of contractor.

37.3 Similarly other items issued as Free Issue Material (FIM) shall be collected by the Contractor from Employer/Consultant's designated storage yard(s) as directed by Engineer-in-Charge. Contractor shall arrange for handling of FIM including crane etc. for loading/unloading, transportation of FIM to required site location free of cost.

37.4 Contractor shall lift the entire quantity envisaged for the part as required (inclusive of extra pipe quantity) to cater to the wastage, re-routing etc., encountered during the construction; store it properly in the pipe yard maintained by the contractor.

38.0 STATUTORY APPROVALS

38.1 Employer shall obtain general in-principle permissions from most of the authorities having jurisdiction over the area as necessary for construction of the pipeline. However, specific site related work / coordination with concerned authority required for executing the job will have to be done by the Contractor. Contractor may have to follow up/expedite with the concerned authorities to execute the job in time. All the statutory payment required for such purpose shall be reimbursed by Employer at actuals on production of documentary evidence.

38.2 The Contractor shall arrange the inspection of the works by the authorities and necessary co-ordination and liaison work in this respect shall be the responsibility of the contractor. However statutory fees paid, if any, for all inspections and approvals by such authorities shall be reimbursed at actual by the Employer/Consultant to the contractor on production of documentary evidence.

38.3 Any change/ addition required to be made to meet the requirements of the statutory authorities shall be carried out by the contractor free of charge. The inspection and acceptance of the work by statutory authorities shall however, not absolve the contractor from any of his responsibilities under this contract.

38.4 Statutory approvals of all type of permanent buildings are to be in the scope of contractor. Detection / intimation of foreign utility and pipelines shall be in the scope of contractor. Necessary safety of such utilities shall be ensured by the contractor during construction.

39.0 TESTS AND INSPECTION

39.1 The Contractor shall carry out the various tests as enumerated in the technical specifications of this bid document and the technical documents that will be furnished to him during the performance of the work.

39.2 All the tests either on the field or at outside laboratories concerning the execution of the work and supply of materials by the Contractor shall be carried out by Contractor at his own cost.

39.3 The work is subject to inspection at all times by the Engineer-in-Charge. The contractor shall carry out all instructions given during inspection and shall ensure that the work is being carried out according to the technical specifications of this bid document, the technical documents and the relevant codes of practice will be furnished to him during the performance of the work.

39.4 The Contractor shall provide for purposes of inspection access ladders, lighting and necessary instruments at his own cost.

39.5 Any work not conforming to execution drawings, specifications or codes and approved methodology / scheme shall be rejected forthwith and the Contractor shall

carryout the rectifications at his own cost.

39.6 All results of inspection and tests will be recorded in the inspection reports, proforma of which will be approved by the Engineer-in-Charge. These reports shall form part of the completion documents.

39.7 For materials supplied by Employer/Consultant, Contractor shall carryout the tests, if required by the Engineer-in-Charge, and the Employer/Consultant shall reimburse the cost of such tests at actual to the Contractor on production of documentary evidence.

39.8 Statutory fees paid to IBR authorities and for repeat tests and inspection due to failures, repairs etc. such reasons attributable to the Contractor shall be borne by the Contractor.

39.9 Inspection and acceptance of work shall not relieve the Contractor from any of his responsibilities under this Contract.

39.10 Along-with PMC's representatives, IGGL shall also depute its Third-party inspectors (TPI's) for quality surveillance of all pipeline construction jobs at site and Procedure's verification etc. IGGL appointed TPI may issue Non-Conformity (NC's) and may give Observations time to time in case of any deviations from the Standard procedure and Codes during construction works and procedures followed by the contractors for different activities involved in laying of pipeline. NC's and observations raised by the TPI shall necessarily be closed within given time frame by the contractor in consultation with IGGL/PMC.

40.0 INSPECTION OF SUPPLY ITEMS

40.1 All inspection and tests on bought out items shall be made as per the specifications forming part of this contract. The Contractor shall submit a **Categorisation Plan** of all the supply items indicating the type of inspection required for review by PMC. Various stages of inspection and testing shall be identified after receipt of Quality Assurance Programme from the Contractor/ Manufacturer. All supplies are subject to pre-dispatch inspection from any of the TPI agencies (Refer Appendix-VI to PJS) and shall be arranged by the Contractor at his own cost.

40.2 Inspection calls shall be given for associations of Employer/ Consultant's representative as per mutually agreed programme in prescribed proforma with 15 days margin, giving details of equipment and attaching relevant test certificates and internal inspection report of the Contractor. All drawings, General Arrangement and other contract drawings, specifications, catalogues etc. pertaining to equipment offered for inspection shall be got approved from Employer/Consultant and copies shall be made available to Employer/Consultant beforehand for undertaking inspection.

40.3 The contractor shall ensure full and free access to the inspection Engineer of

Employer/Consultant at the Contractor's or their sub-contractor's premises at any time during contract period to facilitate him to carry out inspection and testing assignments.

40.4 The contractor/ sub-contractor shall provide all instruments, tools, necessary testing and other inspection facilities to inspection engineer of Employer/Consultant free of cost for carrying out inspection.

40.5 Where facilities for testing do not exist in the Contractor's/ sub-contractor's laboratories, samples and test pieces shall be drawn by the Contractor/ Sub-Contractor in presence of Inspection Engineer of a Employer/Consultant and duly sealed by the later and sent for testing in Government approved Test House or any other testing laboratories approved by the Inspection Engineer at the Contractor's cost.

40.6 Along-with PMC's representatives, IGGL may also depute its Third-party inspectors (TPI's) for sample inspection of Contractor's bought out items at supplier/vendor's works and any observations or non-conformity raised by TPI during inspection of materials to be necessarily resolved before issuance of Inspection release note (IRN).

41.0 FINAL INSPECTION

41.1 After completion of all tests as per specification the whole work will be subject to a final inspection to ensure that job has been completed as per requirement. If any defects noticed in the work attributable to Contractor, the Contractor at his own cost shall attend these, as and when the Employer/Consultant brings them to his notice. The Employer/Consultant shall have the right to have these defects rectified at the risk and cost of the contractor if he fails to attend to these defects immediately

42.0 COMPENSATION FOR EXTENDED STAY

42.1 The clause no. 87 (vi) of GCC is modified to the following extent:

42.1.1 In case the Contractual Completion Date is delayed beyond the time schedule indicated in the bidding document plus a grace period equivalent to 1/5th of the time schedule or 8 weeks whichever is more, due to reasons solely attributable to Employer/Consultant, the contractor shall be paid extended stay compensation in order to maintain necessary organizational set up and construction tools, tackles, equipments etc. at site of work.

After the grace period, extended stay compensation will be paid by Owner limiting to @ INR ***61,59,350/- (Indian Rupees Sixty-one lakhs Fifty Nine Thousand Three hundred Fifty Only) per month inclusive of GST*** (limited to maximum period of 3 month after completion period + Grace Period), subject to fulfillment of requirement as stipulated in Annexure-13, 14 and 15 to Special Conditions of Contract. Further expenditure incurred on account of extension of insurance policies / PBG etc. is

inclusive in the above stated Extended Stay Compensation.

42.1.2 In case the completion of work is delayed beyond completion period plus grace period plus extended stay compensation paid period, then both the Employer/Consultant and the Contractor shall mutually decide the future course of action like payment of further extended stay compensation charges, to get the job executed through an alternate agency based on fresh tender or to get the job executed through an existing contractor or De-mobilize & then to re-mobilize etc. as per contract provision.

43.0 COMPUTERIZED CONTRACTORS BILLING SYSTEM

43.1 Without prejudice to stipulation in General Conditions of Contract, Contractor should follow following billing system.

43.2 The bills will be prepared by the contractors on their own PCs as per the standard formats and codification scheme proposed by IGGL/MECON. The contractors will be provided with data entry software to capture the relevant billing data for subsequent processing. Contractors will submit these data to IGGL/MECON in an electronic media along with the hard copy of the bill, necessary enclosures and documents. The contractor will also ensure the correctness and consistency of data so entered with the hard copy of the bill submitted for payment.

43.3 Employer/Consultant will utilize these data for processing and verification of the Contractor's bill and payment."

44.0 TEMPORARY WORKS

44.1 All Temporary and ancillary works including enabling works connected with the work shall be responsibility of the Contractor and the price quoted by them shall be deemed to have included the cost of such works which shall be removed by the contractor at his cost, immediately after completion of his work.

45.0 DISTINCTION BETWEEN FOUNDATION AND SUPERSTRUCTURE

45.1 To distinguish between work in foundations and superstructures, the following criteria shall apply:

45.1.1 For all Equipment pedestals, pipe racks, other foundation and R.C.C. Structures, work done upto 300 mm level above finished grade level will be taken as work in foundations and work above this level will be treated as work in superstructures and payments would be made accordingly.

45.1.2 For Buildings only, all works upto level corresponding to finished floor level shall be treated as `Work in foundation' and all works above the finished floor level shall be treated as "Work in superstructure".

45.1.3 Irrespective of what has been stated above, all pavements, R.C.C. Retaining wall, all pipe sleepers and any similar item would be taken as work done in foundations irrespective of locations, nomenclature and levels given anywhere.

45.1.4 Where not specifically pointed out all works in Cellars/ sumps, Tank Pads, Cable trenches, or such similar item would be taken as work in foundation.

46.0 QUALITY ASSURANCE/ QUALITY CONTROL

46.1 Bidder shall include in his offer the Quality Assurance Programme containing the overall quality management and procedures, which is required to be adhered to during the execution of contract. After the award of the contract detailed quality assurance programme shall be prepared by the contractor for the execution of contract for various works, which will be mutually discussed and agreed to.

46.2 The Contractor shall establish document and maintain an effective quality assurance system outlined in recognized codes.

46.3 Quality Assurance System plans/procedures of the Contractor shall be furnished in the form of a QA manual. This document should cover details of the personnel responsible for the Quality Assurance, plans or procedures to be followed for quality control in respect of Engineering, Procurement, Supply, Installation, Testing and Commissioning.

The quality assurance system should indicate organizational approach for quality control and quality assurance of the construction activities, at all stages of work at site as well as at manufacture's works and dispatch of materials.

46.4 The Employer/Consultant/Consultant or their representative shall reserve the right to inspect/witness, review any or all stages of work at shop/site as deemed necessary for quality assurance.

46.5 The contractor has to ensure the deployment of Quality Assurance and Quality Control Engineer(s) depending upon the quantum of work. This QA/QC group shall be fully responsible to carryout the work as per standards and all code requirements. In case Engineer-in-Charge feels that Contractor's QA/QC Engineer(s) are incompetent or insufficient, contractor has to deploy other experienced Engineer(s) as per site requirement and to the full satisfaction of Engineer-In-Charge.

46.6 In case contractor fails to follow the instructions of Engineer-in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer-in-charge.

46.7 The Contractor shall adhere to the quality assurance system as per Consultant's Specification enclosed in the Bidding Document as **Annexure-6**.

47.0 HEALTH SAFETY AND ENVIRONMENT (HSE) MANAGEMENT

47.1 The Contractor, during entire duration of the Contract, shall adhere to HSE requirement as per spec. enclosed in the bidding document as **Annexure-7**.

48.0 SITE CLEANING

48.1 The Contractor shall clean and keep clean the work site from time to time to the satisfaction of the Engineer-in-Charge for easy access to work site and to ensure safe passage, movement and working.

48.2 If the work involves dismantling of any existing structure in whole or part, care shall be taken to limit the dismantling up to the exact point and/or lines as directed by the Engineer-in-Charge and any damage caused to the existing structure beyond the said line or point shall be repaired and restored to the original condition at the Contractor's cost and risks to the satisfaction of the Engineer-in-Charge, whose decision shall be final and binding upon the Contractor.

48.3 The Contractor shall be the custodian of the dismantled materials till the Engineer-in-Charge takes charge thereof.

48.4 The Contractor shall dispose off the unserviceable materials, debris etc. to any area as decided by the Engineer-in-Charge.

48.5 The Contractor shall sort out, clear and stack the serviceable materials obtained from the dismantling/renewal at places as directed by the Engineer-in-Charge.

48.6 No extra payment shall be paid on this account.

49.0 COMPLETION DOCUMENTS

A) Notwithstanding the provisions contained in standard specification, upon completion of work, the Contractor shall complete all of the related drawings and documents to the "AS BUILT" stage (including all vendor / sub-vendor drawings for bought out items), all Free-Issue-Material (FIM) documents and provide the Owner/Consultant, the following:

(i) One complete bound set of all original documents as mentioned but not limited to documents listed elsewhere in the bid document.

(ii) **Three complete bound sets of documents as mentioned at (i) above, in original size and in 3 (three) Hard drive/ USB drive**

(iii) Three complete bound sets of Contractor's specification including design calculations.

(iv) Three copies of Daily Progress Reports

(v) Three sets of all raw data collected / generated for and during execution of the entire job as specified in documents requirement.

(vi) **Three sets of Closure report.**

B) Completion Documents

The following documents shall be submitted in hard binder by the CONTRACTOR **in 3 (Three) sets, as a** part of completion documents:

i) Welding Procedure Qualification Report.
ii) Welder Qualification Report.
iii) Radiographic Procedure Qualification.
iv) Radiographic Report along with radiographs (Radiographs only with the original).
v) Batch Test Certificate from manufacturers for electrodes.
vi) Hydrostatic and other test results & reports.
vii) Electronic Geometry Pigging results & reports as specified in technical document.
viii) Pre-commissioning/ Commissioning checklist.
ix) All other requirements as specified in the respective specifications.
x) As built drawings.
xi) Any other drawing/document/report specified elsewhere in the bidding document

Note:- The Contractor shall be eligible to apply for issue of completion certificate after submission of completion documents as mentioned above.

50.0 COORDINATION WITH OTHER AGENCIES

50.1 Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action of the Contractor. Proper coordination with other agencies will be Contractor's responsibility. In case of any dispute, the decision of Engineer-in-Charge shall be final and binding on the Contractor.

51.0 VOID

52.0 UNDERGROUND AND OVERHEAD STRUCTURES

52.1 The information to possible extent regarding existing structures/overhead lines, existing pipelines and utilities are already indicated on alignment sheets. Over and above contractor may encounter other structure/pipelines/ OFC etc. which may not be appearing on alignment sheet, the contractor is required to collect such information on his own before commencing the work. Contractor must intimate the Local Officer concerned of the utility about the pipeline construction activities and take necessary steps to ensure safety and protection to men, materials and utility provided. The Contractor shall execute the work in such a manner that the said structures, utilities, pipelines etc. are not disturbed or damaged, and shall indemnify and keep indemnified the Employer/Consultant from and against any destruction

thereof or damages thereto.

53.0 TEST CERTIFICATES

53.1 Bidder shall be required to submit recent test certificates for the material being used in works from the recognized laboratories. These certificates should indicate all properties of the materials as required in relevant IS Standards or International Standards.

53.2 Contractor shall also submit the test certificate with every batch of material supplied which will be approved by Engineer-in-Charge. No secured advance will be given for the materials not having test certificate. In case any test is to be carried out, the same shall be got done in the approved laboratory at the cost of contractor.

54.0 ROYALTY

54.1 Contractor's quoted rate should include the royalty on different applicable items as per the prevailing Government rates. In case, Employer/Consultant is able to obtain the exemption of Royalty from the State Government, the contractor shall pass on the same to Employer/Consultant for all the items involving Royalty.

55.0 EXCAVATION BY BLASTING

55.1 The Contractor shall obtain license from the District authorities for undertaking blasting work as well as for obtaining and storing the explosive as per Explosive Rules 1940, corrected up to date. He shall purchase the Explosives, fuses, detonators etc. only from a licensed dealer. He shall be responsible for the safe custody and proper accounting of the explosive materials. The Engineer-in-Charge and his authorised representative shall have the access to check the contractor's store of explosives and his accounts. In case where the explosive are required to be transported and stored at site, relevant clauses of the Explosive rules 1940 as amended subsequently shall apply. The Contractor shall be responsible for any accident to workman, public or property, due to blasting operations.

56.0 SITE FACILITIES FOR WORKMEN

56.1 Following facilities are to be ensured at all work places where workmen are deployed/engaged by Contractor.

i) Arrangement of first aid
ii) Arrangement for clean drinking water.
iii) Toilets
iv) Canteen where tea & snacks are available
v) A creche where 10 or more women workmen are having children below the age of 6 years.

57.0 EXECUTION OF ELECTRICAL WORKS

The Contractor shall engage an approved electrical agency for execution of electrical works, holding valid electrical contractor license. In case contractor himself executes electrical works then he shall arrange valid electrical contractor license before start of electrical works at site. Notwithstanding, contractor shall adhere to all the safety standards as included in bidding document. For details, refer enclosed scope of work for Electrical works.

58.0 HYDROSTATIC TESTING

58.1 The bidder as per the Technical specification along with their offer taking into account the completion schedule shall furnish the detailed procedure proposed for the hydrostatic testing of pipeline. The necessary piping, pumps etc. shall be provided by the contractor. The final disposal of water after testing shall be contractor's responsibility and should be in such a way that neither the traffic movement even pedestrians nor the standing crop in nearby fields gets affected. Suitable drains shall be provided for this purpose as directed by the Engineer-in-Charge within the contracted prices.

58.2 The Contractor shall propose and obtain approval of Engineer-in-Charge for exact number of test sections, based on drawings, availability of water for hydro testing and keeping in view other exigencies, if any before starting hydro testing work. The Contractor will carryout the hydrostatic test for approved number of test section including preparation for test and tie-ins, without any time and cost implication on this account to Employer/Consultant. Any increase or decrease in number of test sections will not have any cost implication to Owner / Consultant / Contractor.

59.0 VOID

60.0 MAKE OF MATERIALS

60.1 The materials required to be supplied by the contractor under this contract shall be procured only from Employer/Consultant approved vendors. Where the makes of materials are not indicated in the Bidding document contractor shall furnish the details of makes and shall obtain prior approval of Engineer-in-Charge of vendors/sub-vendors before placing order.

61.0 ADDITIONAL WORKS/ EXTRA WORKS

61.1 Employer/ Consultant reserves their right to execute any additional works/ extra works, during the execution of work, either by themselves or by appointing any other agency, even though such works are incidental to and necessary for the completion of works awarded to the Contractor. In the event of such decisions taken by

Employer/ Consultant Contractor is required to extend necessary cooperation, and act as per the instructions of Engineer-in-Charge.

62A.0 <u>COMPENSATION FOR DELAY / PRICE REDUCTION SCHEDULE FOR ANY DELAY</u>

62A.1 Clause no. 27.0 of GCC, pertaining to Compensation for Delay (Price Reduction Schedule) stands modified to the following extent:

62A.1.1 The contractual completion period is as given in the Invitation for Bids and sub-divided into two parts. *PRS shall be levied separately proportionally on Mechanical Completion and Commissioning activities. For the purpose of PRS, Mechanical Completion and Commissioning shall be considered as follows:*

a) Mechanical Completion shall mean Completion of all works related to buried pipeline system, OFC blowing, hydrotesting of aboveground terminal / station piping and associated works, TCP works, successful EGP run for making the system ready to start commissioning activities.*: 15 (Fifteen) Months including mobilization period from the date of FOA.*

b) Commissioning: 03 (Three) Month from the date of Mechanical Completion for Commissioning (Commissioning shall mean Completion of Drying and inertization with nitrogen and/ or Gas-In. It also includes completion of all balance works related to piping, mechanical, Civil, Architectural, Structural, Cathodic protection, Corrosion monitoring system, Instrumentation, Electrical, Telecommunication (OFC termination & splicing etc.) and Fire Fighting works etc. as defined in scope of work to the entire satisfaction of Engineer -in-Charge).

Plots for SV / Receiving Terminal / Dispatch Terminal/ IP etc. shall be handed over progressively. However, in case of delay in handing over of plot by owner for SVs/ IPs/ Receiving terminal/ dispatch terminal etc., the following completion schedule shall be applicable on the individual delayed station/ terminal:

i). 04 months for each Station/Terminal from the date of Plot handing over for Mechanical Completion including all Station piping works, erection of Scrapper/Trap, Piping/ Valve supports etc.

ii) 06 months for balance Station/Terminal jobs (Civil, Structural, Electrical, Architectural, Instrumentation, Corrosion monitoring system, Fire-fighting etc. as defined in scope of work) from the date of handing over of the SV/DT/RT /IP Station plot.

If the Contractor fails to achieve the required progress in station/terminal works, the EIC shall issue three notices. If performance does not improve thereafter, the Owner/Consultant may engage an any other agency to achieve the required progress,

and the actual cost incurred, along with 10% overheads, shall be recovered from the Contractor.

62A.1.2 The Price Reduction Schedule (PRS) under 62A.1.1 above shall be applied as under:

i) *"In case of delay in works related to clause* 62A.1.1 a)*: at the rate of ½ % of 80% of the total executed contract value per week of delay.*

ii) *"In case of delay in works related to clause* 62A.1.1 b): PRS shall be levied at the rate of 0.5% per week on 20% of the total executed contract value. For PRS applicability, each station/terminal shall be assessed individually from its respective handover date, with delay analyzed on a pro-rata basis.

iii) *The total liability of the Contractor to Employer/ Consultant under sub clause no.* 62A.1.1 a) *and* 62A.1.1 b) *on Compensation for Delay/ Price Reduction Schedule shall not exceed 5% (Five Percent) of executed contract value. The compensation on account of any liability(ies) other than above shall be as per provisions of Bidding Documents.*

The value referred in PRS clause is excluding taxes and duties reimbursable by IGGL.

62B.0 RECOVERIES / RETENTIONS

62.B.1 **Recovery/Retention in case of delay or shortfall in deployment of key personnel –** shall be as per Cl. 32.0 of SCC.

62B.2 **Recovery in case of delay in submission of documents -** shall be as per Cl. 32A.0 of SCC.

62B.3 Recovery/Retention in case of non-achievement of construction asking rate shall be as per clause no. 32 of SCC

62B.4 Recovery/Retention in case of non-submission of videography & photography along with monthly RA bills shall be as per clause no. 32B.0 of SCC.

62B.5 **The amount of Rs 100/- per meter shall be retained from the running bill of the contract for pipeline laying against non-completion of OFC blowing for the claimed pipeline section length.**

62B.6 **The CONTRACTOR's maximum liability towards above mentioned (62.B.1 to 62B.5) retention/recovery shall be limited to 2.5% of the final contract price.**

62B.7 **In case the contractor damages OFC of BCPL/ ONGC etc. in the shared ROU, then the cost recovered from IGGL by the stakeholder (BCPL/ ONGC etc.) for disruption of network and repair of OFC shall be recovered from the contractor. This shall be in addition to any other penalties defined elsewhere in the contract.**

62B.8 **Retentions held against the liquidation of checklist points are to be claimed by Contractor after compliance. In case the claim of contractor is not received within six months of actual completion of the contract, the same shall be recovered and no claim in future shall be entertained in this regard.**

62B.9 In some specific cases wherein computed radiography (CR) is not feasible due to site constraints, contractor have to submit request to EIC mentioning reasons for not conducting CR for acceptance/ approval. Cost benefit on account of non-performing the computed radiography and conducting the traditional radiography at specific location **shall be passed to the Client (Owner)** @ INR **1500/- per joint. Further, the Contractor shall be required to digitize all such radiography films carried out by traditional radiography technique at no extra cost to the Client.**

63.0 PROJECT PLANNING, SCHEDULING AND MONITORING SYSTEM

The following schedules/documents/reports shall be prepared and submitted by the Bidder/Contractor for review/approval at various stages of the contract.

63.1 **After the Award of Contract**

a) Time Schedule

The Completion Time Schedule for the work (including mobilization period) as per Annexure-3 to SCC of Tender in all respect, from the date of issue of Fax of Acceptance.

The Bidder is required to submit a Project Time Schedule in Primavera. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner interface activities shall be clearly identified with their latest required dates. Owner reserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line with the overall Project requirement.

b) Scheduling & Monitoring System

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package and sample outputs.

c) Overall Project Schedule

The Contractor shall submit within 1 week of Fax of Acceptance, a sufficiently detailed overall Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.

The network will be reviewed and approved by Engineer- in-Charge and the comments if any shall be incorporated in the network before issuing the same for implementation. The network thus finalised shall form part of the contract document and the same shall not be revised without the prior permission from Engineer-in- Charge during the entire period of contract.

d) Progress Measurement Methodology

The contractor is required to submit within 1 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/ delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner reserves the right to modify the methodology in part or in full.

e) Functional Schedules

The contractor should prepare detailed functional schedules in line with network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and construction.

63.2 **Project Review Meetings**

The Contractor shall present the programme and status at various review meetings as required.

a) Weekly Review Meeting

Level of Participation	:	Contractor's/Consultant's RCM/ Site In charge & Job Engineers.
Agenda	:	a) Weekly programme v/s actual achieved in the past week & programme for next week. b) Remedial Actions and hold up analysis. c) Client query/ approval.
Venue	:	Site Office

b) Monthly Review Meeting

Level of Participation	:	Senior Officers of IGGL/MECON and Contractors.
Agenda	:	a) Progress Status/ Statistics b) Completion Outlook c) Major hold ups/slippages d) Assistance required e) Critical issues f) Client query/ approval
Venue	:	IGGL/MECON Office/ Site at the discretion of Owner/ MECON

63.3 **Progress Reporting Proforma**

A) Monthly Progress Report

This report shall be submitted on a monthly basis within 10 (ten) calendar days from cut-off date, as agreed upon covering overall scenarios of the work. The report shall include, but not limited to the following:

a) Brief Introduction of the work.
b) Activities executed/ achievements during the month.
c) Schedule versus actual percentage progress and progress curves for Detail Engg. Sub-ordering, Manufacturing/ Delivery, Sub-contracting, Construction, Commissioning and Overall and quantum wise status & purchase orders against schedule.
d) Area of concern/ problem/ hold-ups, impacts and action plans.
e) Resources deployment status.
f) Annexures giving status summary for drawings, MRs, deliveries, sub-contracting and construction.
g) Procurement status for items to be supplied by Contractor.

B) Weekly Reports

The report will be prepared and submitted by the Contractor on weekly basis and will cover following items:

a) Activities programmed and completed during the week.
b) Resource deployed men and machines.
c) Quantities achieved against target in construction
d) Record of Man-days lost.
e) Construction percentage progress schedule and actual.

C) Daily Repots

a) Activity programme for the day
b) Progress of the previous day and commutative progress.

c) Manpower & machinery deployed.

D) Any other additional reports/ information as may be required by E.I.C.

63.4 **Progress Reports**

63.4.1 CONTRACTOR shall make every effort to keep the OWNER adequately informed as to the progress of the WORK throughout the CONTRACT period.

CONTRACTOR shall keep the OWNER informed well in advance of the construction schedule so as to permit the OWNER to arrange for requisite inspection to be carried out in such a manner as to minimize interference with progress of WORK. It is imperative that close coordination be maintained with the OWNER during all phases of WORK.

63.4.2 By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER a detailed report covering the progress as of the last day of the previous month. These reports will indicate actual and scheduled percentage of completion of construction as well as general comments of interest or the progress of various phases of the WORK. The frequency of progress reporting by the CONTRACTOR shall be weekly.

63.4.3 Once a week, CONTRACTOR shall submit a summary of the WORK accomplished during the preceding week in form of percentage completion of the various phases of the WORK, to the OWNER.

63.4.4 Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs, test certificate etc. Such progress reports shall be in the form and size as may be required by the OWNER and shall be submitted in at least 3 (three) copies.

63.4.5 Contractor shall prepare daily progress report (DPR) in the desired format and submit it to Engineer-in-charge along-with schedule of next day to Engineer-in-charge.

63.5 **Progress Review Team (PRT) Meeting**

Project Progress shall be reviewed by the PRT Team of IGGL on regular basis. Contractor shall be liable to submit compliance report(s) within 15 days of PRT review meeting(s).
Contractor is also required to submit quarterly closure report within 15 days (of completion of each quarter).

In event of failure of submission of compliance report and quarterly closure reports by the contractor, EIC reserves the right to take appropriate action.

64.0 <u>RESPONSIBILITY OF CONTRACTOR</u>

64.1 It shall be the responsibility of the Contractor to obtain the approval for any revision and/or modifications decided by the Contractor from the Employer/Consultant/ Engineer-in-charge before implementation. Also, such revisions and/or modifications if accepted/ approved by the Employer/Consultant/Engineer-in-charge shall be carried out at no extra cost to the Employer/Consultant. Any changes required during and/or after approval for detailed construction drawings due to functional requirements or for efficient running of system keeping the basic parameters unchanged and which has not been indicated by the Contractor in the data/drawings furnished along with the offer will be carried out by the Contractor at no extra cost to the Employer/Consultant.

64.2 All expenses towards mobilisation at site and de-mobilisation including bringing in equipment, clearing the site etc. shall be deemed to be included in the prices quoted and no separate payments on account of such expenses shall be entertained.

64.3 It shall be entirely the Contractor's responsibility to provide, operate and maintain all necessary construction equipments, scaffoldings and safety gadgets, cranes and other lifting tackles, tools and appliances to perform the work in a workman like and efficient manner and complete all the jobs as per time schedules.

64.4 Preparing approaches and working areas for the movement and operation of the cranes, levelling the areas for assembly and erection shall also be the responsibility of the Contractor. The Contractor shall acquaint himself with access availability, facilities such as railway siding, local labour etc. to provide suitable allowances in his quotation. The Contractor may have to build temporary access roads to aid his own work, which shall also be taken care while quoting for the work.

64.5 The procurement and supply in sequence and at the appropriate time of all materials and consumables shall be entirely the Contractor's responsibility and his rates for execution of work will be inclusive of supply of all these items.

65.0 CHECKING OF LEVELS

65.1 The Contractor shall be responsible for checking levels, orientation plan of all foundations, foundation bolts, etc., well in advance of taking up the actual erection work and bring to the notice of Engineer-in-Charge discrepancies, if any. In case of minor variations in levels etc. the Contractor shall carry out the necessary rectifications to the foundations within his quoted price.

65.2 The Contractor shall also be responsible for checking with templates, wherever necessary, the disposition of foundation bolts with the corresponding bases of structure and shall effect rectifications, as directed, within his quoted rate.

66.0 STORAGE FACILITIES

66.1 The Contractor shall maintain wherever required an air-conditioned room for the

storage of the instruments as well as for calibration and testing of the instruments at his own cost. The contractor shall provide these facilities within the quoted price.

67.0 ABNORMALLY HIGH RATED ITEMS (AHR ITEMS)

Please refer clause no. 41 of ITB, Vol I.

68.0 INSURANCE FOR FREE ISSUE MATERIAL

68.1 Contractor shall at his own expense arrange, secure and maintain insurance cover for Employer/Consultant's supplied free issue materials as defined in Bidding Document. Contractor's quoted price shall be inclusive of all costs on account of insurance liabilities covered under the Contract. Contractor to note that the beneficiary of insurance cover shall be IGGL. The insurance cover of the free issue material shall be for the period from the date of handing over the material to Contractor from Employer/Consultant's designated place of issue/ dumpsite/ earlier Contractor storage yard to date of handing over the completed work to Employer/Consultant. The approximate cost of free issue material is **INR 550 Cr**.

68.2 The schedule of insurance cover for free issue materials given above shall be as follows:

Upto 2 Months	-	20% of value
After 2 Months up to 5 Months	-	50% of value
After 5 Months up to 8 Months	-	80% of value
Beyond 8 Months	-	100% of value

69.0 INSURANCES IN INDIA

69.1 In addition to the insurance covers specified in the General Conditions of Contract to be obtained and maintained by the Contractor, Contractor shall at his own expense arrange, secure and maintain insurance with reputable insurance companies to the satisfaction of the Employer/Consultant as may be necessary and to its full value for all such amounts to protect the works in progress from time to time and the interest of Employer/ Consultant against all risks as detailed herein. The form and the limit of such insurance as defined herein together with the under writer works thereof in each case should be as acceptable to the Employer/Consultant. However, irrespective of work acceptance, the responsibility to maintain adequate insurance coverage at all times during the period of Contract shall be that of Contractor alone. Contractor's failure in this regard shall not relieve him of any of his responsibilities and obligations under Contractor.

69.2 Any loss or damage to the equipment during ocean transportation, port/custom clearance, inland and port handling, inland transportation, storage, erection and commissioning till such time the Work is taken over by Employer/ Consultant, shall

be to the account of Contractor. Contractor shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/or replacement of the parts of the Work damaged or lost. Contractor shall provide the Employer/Consultant with a copy of all insurance policies and documents taken out by him in pursuance of the Contract. Such copies of documents shall be submitted to the Employer/Consultant immediately upon the Contractor having taken such insurance coverage. Contractor shall also inform the Employer/Consultant at least 60 (Sixty) days in advance regarding the expiry cancellation and/or changes in any of such documents and ensure revalidation/renewal etc., as may be necessary well in time.

69.3 Statutory clearances, if any, in respect of foreign supply required for the purpose of replacement of equipment lost in transit and/or during erection, shall be made available by the Employer/Consultant. Contractor shall, however, be responsible for obtaining requisite licenses, port clearances and other formalities relating to such import. The risks that are to be covered under the insurance shall include, but not be limited to the loss or damage in handling, transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, war risk (during ocean transportation only) etc. The scope of such insurance shall cover the entire value of supplies of equipments, plants and materials to be imported from time to time.

69.4 All costs on account of insurance liabilities covered under this Contract will be to Contractor's account and will be included in Contract Price. However, the Employer/Consultant may from time to time, during the currency of the Contract, ask the Contractor in writing to limit the insurance coverage risk and in such a case, the parties to the Contract will agree for a mutual settlement, for reduction in Value of Contract to the extent of reduced premium amounts.

69.5 In addition to the EAR Policy, the Contractor/Insurer shall provide an **add-on insurance cover for Owner's Surrounding Property**, covering physical loss of or damage to the existing assets/properties of third party, arising out of or in connection with the execution of the Works.

The cover shall specifically include the **ONGC assets and BCPL assets** located within the vicinity/surrounding area of the Works, as identified in the list to be provided by the Owner separately. The said add-on cover shall remain in force for the entire period of the EAR Policy and shall provide coverage for such assets against risks arising from the Contractor's activities in connection with the Works.

Property Details of **Brahmaputra Cracker and Polymer Limited (**BCPL) in the shared ROU:

a. Property Details of **Brahmaputra Cracker and Polymer Limited (**BCPL) in the shared ROU:

Asset Description	**Current APC (₹)**
LAKWA LEPETKATA	26,93,30,295.16

PIPE	
PIPES/ Associated	72,62,30,751.00
Pipeline-LEP-DJN	55,83,62,965.00
Total Asset Value (₹)	**1,55,39,24,011.**16

b. Property Details of **Oil and Natural Gas Corporation Limited (ONGC)** in the shared ROU:

Asset Description	**Asset Value (₹)**
ONGC pipeline falling within the shared RoU portion in the proposed	Rs. 3,92,05,93,868/- (Rupees Three Hundred Ninety-Two Crore Five Lakh Ninety-Three Thousand Eight Hundred Sixty-Eight only

The Contractor shall ensure that the Owner's Surrounding Property Cover is incorporated into the insurance arrangement in addition to, and without prejudice to, the coverage provided under the EAR Policy.

In case such add on is not available, the contractor needs to obtain a separate comprehensive general liability policy (CGL) or any similar insurance providing suitable coverage for above-mentioned third-party assets.

69.6 Contractor as far as possible shall cover insurance with Indian Insurance Companies, including marine Insurance during ocean transportation.

70.0 INSURANCE IN FOREIGN COUNTRIES

70.1 The Contractor shall at his own cost arrange, secure and maintain separate insurance cover from the reputable insurance companies, for all such amounts and for such periods as may be necessary to protect the works, Contractor and sub-contractor's personnel and the interests of the Employer/Consultant as per applicable laws of land.

70.2 The form and the limit of insurance cover taken by Contractor shall be satisfactory to Employer/Consultant and one copy of all insurance policies and related documents shall be submitted to Employer/Consultant, immediately on execution. Contractor shall inform Employer/Consultant at least 60 days before any insurance policies expire or are cancelled or changed.

71.0 VOID

72.0 SUBMISSION OF COLOURED PHOTOGRAPHS

72.1 The Contractor shall shoot, prepare and submit coloured photographs (B5 size) in 2 sets along with softcopies to MECON site office along with monthly progress report covering all the activities (minimum 10 nos of photographs covering various phases

of each activities) of pipeline constructions highlighting the progress or other areas of work. Similarly photographs for problem areas (as required) should be submitted well in advance with a proposed methodology to execute the works and meet the construction schedule. The cost of same shall be deemed to be inclusive in the rates and no separate payment shall be made.

73.0 **DISPOSAL OF EMPTY OFC CABLE DRUM - VOID**

74.0 **VIDEOTAPE**

74.1 Contractor shall develop and submit (in Hard Disk / USB) a videotape of three hours duration covering the construction activities showing the nature and magnitude of the work. The video shall be shot and edited to Indian broadcast standards. Videotape recorded in field shall be shot by professional camerapersons and shall meet the technical standards of the HD format (1080p) or better. Video shall cover, but not limited to the following construction activities:

Mobilisation of equipment/ machinery
ROW cleaning/grading
Trenching
Stringing
Welding: Manual & Semi Automatic
Radiography
Joint Coating
Pipe laying
Back filling
crossings
Hydro testing Pre-drying and drying
Restoration of ROU
Laying of optical fibre cable
Various construction and installation at sectionalising valve stations etc.

74.2 Video shall also have coverage on new/ special techniques used in the Contract and major problems encountered, if any, and the measures taken to resolve them. The video shall be supplemented with suitable narration and subtitles explaining the job, techniques and methodology, etc. The video shall be prepared with two narration tracks, one in Hindi one in English. Professional narrators shall voice both. The script shall include explanations of job activities, techniques used methodologies etc. Elements of the video programme sequencing and editing techniques shall be discussed with Employer/Consultant and mutually agreed to before videotaping begins.

Draft script shall be submitted to Employer/Consultant for approval before editing commences.

74.3 Following completion of editing and review and approval of programme by Employer/ Consultant, Contractor shall deliver edited master video to Employer/ Consultant six

copies in hard drive/ USB.

75.0 PIPES FOR WELDING QUALIFICATION

75.1 Contractor for the purpose of qualification of welding procedure may use the pipes issued by Employer/Consultant. However, accounting of such pipes shall be done within the unaccountable wastage and scraps limit as per **Annexure-8 to SCC** enclosed with the bidding document.

75.2 The contractor shall bear all cost towards lifting, carting from issue point to work site/Contractor's store, custody, handling, insurance and levies etc. and return of surplus/scrap materials to employer designated storage point. No separate payment shall be made for such expenditure.

76.0 SPARES

76.1 Contractor shall procure and supply all spare parts required during commissioning of the various items / materials supplied by him as enumerated in the Bidding Document. The quoted lump sum prices shall be deemed to have been inclusive of all such provision of commissioning spares, required till commissioning of such items. Contractor shall make available all the commissioning spares required at site at least 4 (four) weeks before start of commissioning. However, listed spares not used during commissioning shall be handed over to Employer at their designated place. Contractor shall also supply commissioning spares not listed but required during commissioning within the contracted price.

76.2 In addition to above, special tools & tackles required, if any, for operation & maintenance shall also be supplied by the Contractor and the quoted prices shall be deemed to have been inclusive of all such provisions.

77.0 BUILDING AND OTHER CONSTRUCTION WORKER'S ACT

77.1 In order to govern welfare and working conditions of labourers engaged in construction activities, the Building and other Construction Workers' (Regulation of Employment and Conditions of Service "RE &CS") Act, 1996 came into force. RE&CS Act'1996 is applicable in respect of building and other construction work. Wherever applicable, The SUB-CONTRACTOR shall strictly comply with the following provisions pertaining to RE &CS Act'1996.

a. The SUB-CONTRACTOR must be registered with the concerned authorities under the Building and Other Construction Workers' (RE&CS) Act, 1996 or in case of non-registration; the SUB-CONTRACTOR should obtain registration within one month of the award of contract.

b. The SUB-CONTRACTOR shall be responsible to comply with all provisions of the Building and Other Construction Workers' (RE&CS) Act, 1996, the Building and

Other Construction Workers' Welfare Cess Act, 1996, the Building and other Construction Workers' (RE&CS) Rules, 1998 and the Building and Other Construction Workers Welfare Cess Rules, 1998.

c. Cess as per the prevailing rate, shall be deducted at source from bills of the SUB-CONTRACTOR by the engineer-in-Charge of the contract and remitted to the "Secretary, Building and Other Construction Workers Welfare Board" of the concerned State. The SUB-CONTRACTOR shall be responsible to submit final assessment return of the cess amount to the assessing officer after adjusting the cess deducted at source.

78.0 INTERMEDIATE CONSTRUCTION MILESTONE

78.1 Contractor shall adhere to meet the intermediate construction milestones enclosed as **Appendix-I to Particular Job Specification**. Contractor shall be responsible for close monitoring and completion of intermediate construction milestone.

79.0 SINGLE POINT RESPONSIBILITY

79.1 The entire work as per scope of work covered under this contract shall be awarded on single point responsibility basis.

80.0 BONUS FOR EARLY COMPLETION

80.1 The Clause 27.3 of GCC for Bonus for early completion shall not be applicable in this Contract.

81.0 VOID

82.0 VOID

83.0 DIRECT PAYMENTS TO SUB-VENDORS/ SUPPORTING AGENCIES OF MAIN CONTRACTOR

"Normally, the payment is to be made to vendor/ contractor only as per provision of contract. During execution, in case of financial constraints, IGGL may make direct payment to their sub-vendor/ supporting agencies as an exception from the amounts due to the vendors/ contractors from any of their bills under process upon certification by EIC subject to receipt of such request from the vendor/ contractor. Further, the request for direct payments to the sub-vendor/ sub-contractor shall be considered in performance evaluation of such vendor/ contractor. "

84.0 SUB-LETTING OF WORKS

Please refer clause no. 54 of ITB, Vol I

85.0 JOINTS MEASUREMENT OF WORK EXECUTED, BILLING, INVOICE AND PAYMENTS.

85.1 The measurement of the work executed, billing, invoice and payment shall be as per the provisions of contract.

85.2 Measurement shall be recorded as per the methods of measurement spelt out in Specifications/Contract Documents. The responsibility for checking the measurements as recorded in the Measurement Books/Bills shall be as under:

a. PMC will check 100% measurements of executed work.
b. IGGL Site Engineer will check measurements of at least 15% of bill value, certified by PMC.
c. An officer at least one level above Site Engineer not below level of E-7 (or next available highest officer below E-7, where E-7 is not available) will further check measurements of 5% of bill value.

86.0 CONTRACTOR TO ENGAGE CONTRACT MANPOWER BELONGING TO SCHEDULED CASTES AND WEAKER SECTIONS OF THE SOCIETY

Please refer clause no. 48 of ITB, Vol I.

87.0 WAY BILL / ROAD PERMIT: Shall be issued by CONTRACTOR only for transportation of free issue material from one state to another.

88.0 LOCAL EMPLOYMENT

In order to encourage local employment, contractor shall endeavors to deploy personnel pass-out from local institutes including execution of non-critical activities through local agencies. However, preference should be given to engage more unskilled manpower resources locally to boost local employment.

89.0 LOCAL SKILL DEVELOPMENT

Contractor's scope shall also include to provide/ conduct a training program to develop/ enhance skill of local people in association with local technical (Diploma/ ITI) Institute through their skilled manpower (i.e., Forman, Welder Grinder, Fitter, NDT Experts etc.) as a part of Govt. of India's ambitious Skill Development Program.

90.0 QUARTERLY CLOSURE OF THE CONTRACT

Please refer clause no. 44.1 of ITB, Vol I.

91.0 **COMPLETION CERTIFICATE**

"Engineer-in-charges against the contract shall be RCM of PMC, however, the completion certificate shall be issued by IGGL. The provisions of GCC are modified to this extent."

92.0 **PRADHAN MANTRI SURAKSHA BIMA YOJANA (PMSBY) AND PRADHAN MANTRI JEEVAN JYOTI BIMA YOJANA (PMJJBY)**

Contractor shall ensure that all its personnel deployed under this contract have obtained additional insurance coverage under the Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) through the participating banks and submit the proof of such insurance coverage to the satisfaction of IGGL. The cost of the insurance premium amount for both the above schemes shall be borne by the contractor giving evidence/proof to IGGL in this respect and Contractor shall suitably consider the same in their bid.

Both the schemes are to be regulated continuously on yearly basis and the same should be renewed on each successive relevant date in subsequent years.

93.0 E-MEASUREMENT

IGGL will process the Bills with MB through E-Measurement Portal available in IGGL INTRANET under Project Department. Accordingly, Contractor is required to forward the RA Bills in E-Measurement Portal through PMC, CIC/ EIC/ SIC whichever is applicable.

ANNEXURES TO SCC

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SCOPE OF WORK

(ANNEXURE-1 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-1 TO SCC

1.0 **SCOPE OF WORK**

Scope of work shall be as detailed in Particular Job Specification, Technical Specifications, Schedule of Rates & various other parts of this Bidding Document.

SCOPE OF SUPPLY

(ANNEXURE-2 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-2 TO SCC

1.0 SCOPE OF SUPPLY

1.1 Owner's Scope of Supply

Owner's scope of supply shall be as specified in Particular Job Specification, Technical Specifications, Schedule of Rates & various other parts of the Bidding Document. Free Issue Materials shall be issued to the Contractor from the designated store(s) of Owner. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

IGGL's designated store and dumpyard for this project shall be located as follows:

A) **For line pipe**:

SY-01 proposed at Lepetkata, Distt. Dibrugarh, Assam

11.13mm coated line pipe-29,838 m Approx.

SY-02 proposed at Lepetkata, Distt. Dibrugarh, Assam-

12.7 mm coated line pipe-78,000 m (approx.)

SY-03 proposed at Amguri, Distt. Sivasagar, Assam

12.7mm coated line pipe- 78,382 m (approx.),
15.88mm coated line pipe- 2,812 m (approx.),
15.88mm bare pipe- 1,188 m (approx.)

IP-02, Vill- Bagijuli Pathar, Behali, Biswanath Revenue Circle, Distt-Biswanath, Assam

17.48mm bare pipe- 89 m (approx.)

The above locations and quantities are tentative & for planning purpose only. Quantity (up to approx.10-15%) can be re-allocated between dumpsites.

B) **For materials other than line pipe:**

Lepetkata, Distt. Dibrugarh, Assam

Conditions for Issue and Reconciliation of Materials shall be as per Document enclosed as Annexure-8 to Special Conditions of Contract.

1.2 Contractor's Scope of Supply

All materials except what is under Owner's scope of supply (i.e., coated line pipes and metering skid, and required for successful completion of works in all respects shall be supplied by the Contractor and the cost of such supply shall be paid as per respective SOR items. Further, cost of all consumables, incidental and temporary materials shall be deemed to be included in the quoted rates.

1.3 Designated Areas for return of surplus material

Surplus material after execution of work shall be returned back to following locations:
IP-01 at Ch. 96 Km (approx.)

COMPLETION SCHEDULE

(ANNEXURE-3 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-3 TO SCC

COMPLETION SCHEDULE / COMPLETION PERIOD

Name of Work	Completion Schedule / Completion Period
LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE PROJECT OF M/S IGGL (24'' x 174.236 and 24" x 6.027 Km) Approx.	a) Mechanical completion including mobilization period of 1 (one) month- **15 (Fifteen) months from the date of Fax of Acceptance** b) Commissioning - 03 **(Three) months after Mechanical completion**

Notes:

1. The completion schedule as mentioned above is for the total scope of work as mentioned in the bidding document and includes the one-month mobilization period.

2a). Mechanical Completion shall mean Completion of all works related to buried pipeline system, OFC blowing, hydrotesting of aboveground terminal / station piping and associated works, TCP works, successful EGP run for making the system ready to start commissioning activities.: 15 (Fifteen) Months including mobilization period from the date of FOA.

2b). Commissioning shall mean Completion of Drying and inertization with nitrogen and/ or Gas-In. It also includes completion of all balance works related to piping, mechanical, Civil, Architectural, Structural, Cathodic protection, Corrosion monitoring system, Instrumentation, Electrical, Telecommunication (OFC termination & splicing etc.) and Fire Fighting works etc. as defined in scope of work to the entire satisfaction of Engineer -in-Charge.

3). Plots for SV / Receiving Terminal / Dispatch Terminal/ IP etc. shall be handed over progressively. However, in case of delay in handing over of plot by owner for SVs/ IPs/ Receiving terminal/ dispatch terminal etc., the following completion schedule shall be applicable on the individual delayed station/ terminal:

i). 04 months for each Station/Terminal from the date of Plot handing over for Mechanical Completion including all Station piping works, erection of Scrapper/Trap, Piping/ Valve supports etc.

ii) 06 months for balance Station/Terminal jobs (Civil, Structural, Electrical,

Architectural, Instrumentation, Corrosion monitoring system, Fire-fighting etc. as defined in scope of work) from the date of handing over of the SV/DT/RT /IP Station plot.

4. Contractual Completion Date shall be the date of commissioning defined at para no. 2b above.

5. Contractor shall be responsible for liquidation of all checklist/punch list points to the satisfaction of EIC within 2 months from the date of Contractual completion. Considerable amount as decided by EIC shall be kept under hold till liquidation of checklist/Punchlist points. The completion certificate will be issued by the EIC only after liquidation of all Punch-list points.

_____

(**STAMP & SIGNATURE OF BIDDER**)

MEASUREMENT OF WORK

(ANNEXURE-4 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-4 TO SCC

MEASUREMENT OF WORK

1.0 **GENERAL**

1.1 The mode of measurement shall be as mentioned in relevant standard specification incorporated in the Bidding Document. Any other mode of measurements not covered in above specifications shall be followed in accordance with relevant BIS codes/ Schedule of Rates/ Specifications etc. and/ or as decided by Engineer-in-charge.

1.2 Payment will be made on the basis of joint measurements taken by Contractor and certified by Engineer-in-charge. Measurement shall be based on "Approved for Construction" drawings, to be the extent that the work conforms to the drawings and details are adequate.

1.3 Wherever work is executed based on instructions of Engineer-in-charge or details are not adequate in the drawings, physical measurements shall be taken by Contractor in the presence of Engineer-in-charge.

1.4 Measurements of weights shall be in metric tonnes corrected to the nearest Kilogram. Linear measurements shall be in meters corrected to the nearest centimeters.

1.5 The weights mentioned in the drawing or shipping list shall be the basis for payment. If mountings for panels etc. are packed separately, their erection weights shall include all mountings.

1.6 Welds, bolts, nuts, washers etc. shall not be measured. Rates for structural steel work shall be deemed to include the same.

1.7 No other payment either for temporary works connected with this Contractor or any other item such as weld, shims, packing plates etc. shall be made. Such items shall be deemed to have been included for in the rates quoted.

1.8 Measurement will be made for various items under schedule of rates on the following basis as indicated in the unit column.

i)	Weight	:	MT or Kg
ii)	Length	:	M (Metre)
iii)	Number	:	No.
iv)	Volume	:	Cu.M
v)	Area	:	Sq.M

1.9 All measurements shall be in metric system. All the works in progress will be jointly measured by the representative of the Engineer-in-charge and the contractor's authorized agent progressively. Such measurements will be either recorded/typed by

the contractor in the numbered measurement sheets to be supplied by Engineer-in-Charge / Owner or computerized by Contractor themselves. The measurements shall be signed in token of acceptance by the contractor or his authorized representative. The contractor shall submit the bill in the approved performa in triplicate to the Engineer-in-Charge of the work.

2.0 **PIPING**

2.1 Length of pipes shall be measured along the curvilinear centre of the pipelines laid/ installed and shall include all types of specials, fittings, mitre bends etc. but excluding all types of valves. Length of valves shall be excluded from piping measurement and shall be considered on number basis.

2.2 All Socket weld fittings & hot/cold bends, reducers etc. for size 1½" and below shall be fabricated and erected as per requirements by the contractor at no additional cost and his rates for piping of size 1½" and below shall be inclusive of this work.

2.3 Vents and drains shall be measured from O.D. of pipe lines and shall be paid for at the corresponding unit rates for similar sizes of pipe. Other piping attachment such as couplings, earthing lugs etc. shall be supplied & erected by the contractor within his quoted rates for piping.

2.4 Fabrication of spool pieces for temporary use to aid Contractor's work such as fabrication, erection, flushing and testing of piping etc. shall be done by Contractor as part of piping work and no separate payment shall be made for this.

2.5 In case of branch piping, the measurement shall be made from outer surface of the main line except in case of equal size branches, in which case measurement shall be made from centre line of the branching header.

2.6 Erection of Valves

Erection of all types of valves such as gate/ globe / check / plug / needle/ ball / control/ safety valves etc. will be paid on number basis at the rates given separately in the Schedule of Rates. Any dismantling and re-erection of the valves required for the purpose of testing, calibration etc. will be carried out by the contractor within his quoted rates.

2.7 Fabrication of Supports

- Fabrication of all types of pipe supports, provided as per drawings & instructions of the Engineer-in-Charge, will be paid on weight basis. Bolts, nuts and washers including U-bolt will be supplied by contractor. Weight of bolts, nuts and clamps etc. shall not be added to the weight of pipe support for payment purpose.

- Erection of all types of supports, spring supports and turn buckles, including grouting of supports, if required, shall be carried out by the Contractor as part of piping work and no separate payment will be made for it.

- While fabricating the supporting elements, the contractor will ensure that the dimensions shown in the drawings match with site conditions. No payment shall be made for rectification arising out of discrepancies in dimensions of the fabricated items of supporting elements due to site conditions.

- Additional supports as necessary with the site condition shall be fabricated and erected in accordance with the standard engineering practices and instructions of Engineer-in-charge.

3.0 RADIOGRAPHY/DYE-PENETRANT EXAMINATIONS/ MAGNETIC PARTICLE TEST (MPT)

Payment for radiography shall be made on the basis of circumferential joints for different pipe dia. Repeat radiography due to defective films or on repaired joint due to Contractor's fault or for additional radiography necessitated due to poor performance of Contractor's welder will be done at Contractor's cost.

4.0 STRUCTURAL STEEL WORK

4.1 Payment for steel work shall be made on basis of admissible weight of the structure accepted, the weight being determined as described below.

4.2 The weight for payment will be assessed from the approved fabrication drawings and the respective bill of materials prepared by the contractor and approved by the Engineer-in-Charge. The weight of structural material/ Plate shall be calculated wherever necessary on the basis of IS Hand Book. If spreads are different from IS spreads, then Manufacturer Hand Book shall be referred to.

4.3 Spreads built out of plates/structural shall be paid on the actual weight incorporated except for gussets which will be paid on the weight of the smallest rectangle enclosing the shape.

4.4 Gratings shall be paid on the basis of calculated weights as determined from the dimensions given on the design drawings/ bill of materials. Full deduction shall be made for all opening above 300 mm size and skews.

4.5 Welds, bolts, nuts, washers etc. shall not be measured. Rate of structural steel work shall be deemed to include the same.

4.6 No other payment either for temporary works or for any other item such as welds, shims, packing plates etc., shall be made. Such items shall be deemed to have been included in the rate quoted for steel work.

5.0 ELECTRICAL WORKS

5.1 Cables

The measurement for cable laying shall be made on the basis of length actually laid from lug to lug including that of loops provided and paid accordingly.

5.2 The weights mentioned in the drawing or shipping list shall be the basis for payment. If mountings are sent separately (for panels etc.) to facilitate transportation then erection weight shall be inclusive of all mountings. For structural steel measurements/payment shall be made as per finished items.

6.0 INSTRUMENTATION WORKS

6.1 Measurement of primary piping/ tubing between piping or equipment on one side and the instrument on the other side will be from the first break flange or tubing fitting up to the first block valve of fabricated instrument manifold or up to first tee of instrument manifold for integral type manifolds. All piping / fittings at the first block valve or the piping / equipment side up to break flange or tubing fittings shall be excluded. Any valve manifold tubing forming part of manifold or drain connection for instruments up to 1.5 meters individually or each drain connection shall be excluded.

6.2 Air lines and any other utility lines will be measured from end to end including valves and pipe fittings.

6.3 Copper tube measurement will be taken between the two fittings of the copper tube.

6.4 Direct mounted instrument and instruments mounted on support shall be accounted in terms of the quantity in numbers.

6.5 Muti-core cables/ multi-tubes will be measured between the junction box and its termination inside the control room."

6.6 Two/Three core cables shall be measured between two end terminals.

6.7 No separate payment will be made for receiving, handling and transportation of owner issued materials from owner's/ MECON storage points to contractor's store/ workshop and the same are deemed to be included in the unit rates for the respective item of work."

6.8 Erection Weights

The weights mentioned in the drawings or shipping list shall be the basis of payment. If mountings are sent separately (for panel etc.) to facilitate transportation then erection weight shall be inclusive of all such mountings. For structural steel, measurements / payment shall be made as per finished items."

7.0 PAINTING ON EQUIPMENTS/PIPING/STRUCTURAL STEEL ETC.

a) EQUIPMENTS

I) For columns, vessels, reactors, Exchangers, furnaces, ejectors etc., measurement shall be on square meter basis taken over the painted surface.

II) For pumps, motors and compressors measurement shall be made on number basis.

b) PAINTING ON PIPING INCLUDING SPECIALS AND FITTINGS

I) Payment will be made on linear measurement in 'Meters' corrected to the nearest centimeter.

II) Piping shall be measured along the centre line through all types of fittings and flanges.

III) Rates for painting of pipes shall be inclusive of painting of all types of pipe supports, flanges, guides, shoes, saddles, clamps, etc. and also all types of fittings except valves (2" and above) which shall be paid separately on number basis.

IV) There will be no separate measurements of the colour bands/ identification signs (line numbering), flow direction etc. on un-insulated piping, the rates of painting of linear length of piping shall be inclusive of cost of such items.

c) PAINTING ON STEEL STRUCTURE

I) Payment for steel structures shall be made on the basis of admissible weight of structure painted.

II) Welds, bolts, nuts, washers etc. shall not be measured and rates for painting of structure shall be inclusive of painting such items.

TERMS OF PAYMENT

(ANNEXURE-5 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-5 TO SCC

TERMS OF PAYMENT

TERMS OF PAYMENT

Pending completion of the whole works, provisional progressive payments for the part of work executed by the contractor shall be made by Owner on the basis of said work completed and certified by the Owner's representative as per the agreed milestone payment schedule and the percentage break-ups given below.

Contractor shall submit his invoices to the Owner's representative fortnightly in the manner as instructed by Owner. Each invoice will be supported by documentation acceptable to Owner and certified by the Owner's representative. Payments made by owner to the contractor for any part of the work shall not deem that the Owner has accepted the work. All payments against running bills are advance against the work and shall not be taken as final acceptance of work / measurement carried out till the final bill. Owner will release payment through e-payments only as detailed in the bidding document.

1.0 MAINLINE WORKS

1.1 Pipeline Laying with Associated Works (for Mainline works SOR item no. 1.0)

S. No.	Milestone	Payment
1.1.1	Completion of site development, stacking, clearing, grading of ROU and stringing	8% progressively
1.1.2	Completion of RoU Survey with pipeline locator	2% progressively
1.1.3	Completion of fabrication, alignment, field welding, NDT (radiography)	30% progressively
1.1.4	Completion of bending, joint coating, trenching & lowering	20% progressively
1.1.5	Completion of tie-ins, tie-in NDT, tie-in joint coating HDPE duct laying and backfilling	10% progressively
1.1.6	Completion of Hydro testing and OFC blowing	11% progressively
1.1.7	Completion of dewatering, swabbing and magnetic cleaning	4% progressively
1.1.8	Completion of electronic geometry pigging	3% progressively
1.1.9	Completion of all activities and their acceptance including Vacuum Drying and Inertization/Gas-in	5% progressively
1.1.10	Restoration and obtaining NOC from respective land owner / farmers and statutory authorities as required	2% progressively
1.1.11	Material reconciliation and acceptance of the same; Submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order	5%

The above payment shall be made subject to the following:

i) The stage payment of 20% as per Sl. No. 1.1.4 above will be released on completion of continuous stretch of min. 4 km. However, depending on site conditions, EIC may authorize to release payment for execution of non-continuous stretch.

ii) For release of payment of 11% as per Sl. No. 1.1.6 above: Completion of hydro-testing and OFC blowing, the payment shall be released only on completion of hydro testing and OFC blowing of the hydro-tested section.

iii) For discontinuity on account of major crossings (NH/ SH, Railway, Rivers, lake) specified in SOR, crossing length shall not be taken into account for (i) above for payment purposes. The payment towards such crossings shall be made on the basis of item rate in SOR.

iv) Payment terms for HDPE duct laying, OFC blowing, dewatering, swabbing, magnetic cleaning, EGP, Vacuum drying and inertization/ gas-in etc. shall be as described further in the document and shall be payable as per relevant SOR item.

1.2 HDD and Associated Works

1.	All type of pre-construction survey required for Design & calculation, Detail engineering, drawing, execution plan and their approval	**2%**
2.	Approval of Design & calculation, detail engineering, drawing and Execution plan	**1%**
3.	Pipeline string preparation and pre-testing (after stringing, welding, NDT, Joint coating), CS Conduit string preparation, welding & application of Coal tar Epoxy.	**5%**
4.	Mobilization and placement of Drilling Rig (HDD M/c) at site along with all the accessories and consumables	**2%**
5.	Successful completion of pilot hole	**10%**
6.	Successful installation of carrier pipeline section by HDD, cleaning and successful gauging of HDD section.	**40%**
7.	Post hydro-testing, dewatering, swabbing and tie-in with Mainline	**20%**
8.	TCP works, Integrity of corrosion coating of installed 3 LPE pipeline, Duct Integrity Test & OTDR for OFC	**5%**
9.	Final Clean-up & restoration of area, disposal of drilling fluid and	**5%**

waste etc. and acceptance of the system by Owner

10. Submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order **10%**

Notes:

i) Serial No. 8 payment will be done only on completion of OFC blowing in the HDD section

ii) Failure of activities, i.e., pulling, gauging, post hydro-testing etc. shall be responsibility of Contractor and no payment on account of any activity shall be payable to Contractor. Moreover, earlier successive payments made through RA Bills shall also be recovered. Loss of free issue material occurred due to failure shall be treated in-line with the provision of reconciliation of free issue material.

1.3 Crossing & Other items not covered above or elsewhere in the Tender

S. No.	Milestone	Payment
a)	Completion of individual items of work	90% progressively
b)	Completion of all activities and their acceptance Submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.	10% progressively

1.4 OPTICAL FIBRE CABLE (Laying with Associated Works)

1.	Completion of Laying/ Blowing of OFC in same Pipeline Trench	:	30% progressively
2.	Supply & Erection of Jointing Pit, Jointing of OFC as per Specification	:	20% progressively
3.	OFC Testing as per Specification	:	40% progressively
4.	Final completion, handing over of complete pipeline system and acceptance of the system by Owner	:	10%

Note:

The above payments shall be made subject to the following:

a. In case, requirement of ROU related compensation arises for OFC cable blowing beyond two months of completion of hydro test of a Pipeline section, same shall be borne by laying contractor.

1.5 HDPE DUCT (Laying with Associated Works)

1.	Completion of Laying of Duct in same Pipeline Trench	:	30% progressively
2.	Supply & Erection of blowing pit every km, duct jointing for testing & termination of duct in the pit with end cap	:	25% progressively
3.	Testing of HDPE Duct & Accessories after laying, preparation of report as per Specification	:	35%
4.	Final completion, handing over of complete pipeline system and acceptance of the system by Owner	:	10%

1.6 ROU Management for Mainline Works

a)	After completion of welding	:	40%
b)	After completion of lowering & back-filling	:	50%
c)	After obtaining NOC (after restoration) from respective land owner/ farmers and statutory authorities as required.	:	10%

1.7 Supply of Line Pipe

S. No.	Milestone		Payment
a)	On delivery at site	:	90% progressively
b)	Completion of all activities and their acceptance Submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.	:	10% progressively

2.0 CATHODIC PROTECTION WORKS

The basis for payment against various items shall be as follows :

2.1 Temporary Cathode Protection System

a) 5% on placement of order on sub-vendor.
b) 5% on design approval of TCP Package.

c) 60% on receipt of material at site and acceptance thereof.
d) 20% on installation, testing, pre-commissioning and commissioning.
e) 10% on completion of all activities and their acceptance. Submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.

3.0 TERMINALS WORKS

3.1 Piping Works

a) 35% on fabrication of piping.
b) 40% on erection, alignment, welding complete to achieve mechanical completion.
c) 15% on flushing, testing, draining, drying, etc.
d) 10% on completion of all activities and their acceptance, submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.

3.2 Civil Works & Architectural Works

a) 90% on completion of work on pro-rata basis as certified in running bills.
b) 10% on completion of all activities and their acceptance, submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.

3.3 Structural Works

a) 5% on approval of fabrication drawings.
b) 40% on supply and acceptance of material at site.
c) 20% on fabrication.
d) 25% on erection, alignment, welding, painting, etc.
e) 10% on completion of all activities and their acceptance, submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.

3.4 Items including supply of finished goods (Mechanical, Electrical, Corrosion Monitoring System (CMS) & Instrumentation)

a) 5% on placement of order on sub-vendor
b) 65% on receipt of material at site and acceptance thereof.
c) 15% on erection, alignment, welding, grouting, painting, etc.
d) 5% on testing.
e) 10% on completion of all activities and their acceptance, submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.

3.5 Items including supply of finished goods (Telecommunication)

a) 5% on placement of order on sub-vendor
b) 65% on inspection of material at manufacturing premises by IGGL/PMC, receipt and acceptance of material at site.
c) 5% after laying of HDPE duct and testing
d) 15% after blowing of OFC cable, installation of jointing pits, termination of cable on FTC, hop testing and commissioning.
e) 10% on completion of all activities and their acceptance, submission of final documents, as built drawings, demonstrations of testing to IGGL/PMC and acceptance of these by owner thereafter for successful closure of work order.

3.6 Equipment Erection Works (Installation of Scrapper Trap, Filter, etc.)

a) 45% on transportation and installation in position.
b) 30% after initial alignment, leveling and grouting.
c) 15% after final alignment and making ready for commissioning.
d) 10% on completion of all activities and their acceptance, submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.

3.7 Electrical, Instrumentation and Telecommunication Works

a) 80% on completion of installation.
b) 10% on testing and completion of all wiring (for Scada) and demonstration by laying contractor for all the signals. Wiring up to TIC panel to be simulated and demonstrated to IGGL/PMC by laying vendor and jointly certified in the format in Appendix- I.
c) 10% on completion of all activities and their acceptance, submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order.

3.8 HDPE duct laying inside terminal

a) Completion of laying of HDPE duct in same pipeline trench – 30% progressively
b) HDPE duct testing - 60% progressively
c) Final completion, handing over of complete pipeline system and acceptance of the system by the owner - 10%

3.9 OFC laying inside terminal

a) Completion of laying/blowing of OFC inside HDPE duct in same pipeline trench – 30% progressively
b) OFC testing - 60 progressively
c) Final completion, handing over of complete pipeline system and acceptance of the system by the owner - 10%

3.10 For Lumpsum Items

For all lumpsum items included in schedule of rates, contractor shall furnish price break-up for quoted lumpsum prices for the approval of Engineer-in-charge. Payment for such item shall be made accordingly. In this regard decision of Engineer-in-charge shall be final and binding to the bidder.

3.11 Supply of Materials and All Other Works (not mentioned under 3.1 to 3.10)

a) Completion of individual items of work : 90% progressively
b) Completion of all activities and their acceptance, submission of final documents, final bill and acceptance of these by owner thereafter for successful closure of work order. : 10%

4.0 For Pipeline Information Management System (PIMS)

4.1 For Lumpsum Items
Milestone Payment Schedule and the Percentage Break-up of SOR are given below:

Sl. No.	ACTIVITY/ MILESTONE	Payment terms (%)	Cumulative %
A	**Implementation of web based & GIS based PIMS (including pre-construction, construction, materials etc.) for pipeline as well as stations.**		
	Configuration of PIMS application & uploading of pre-construction data (such as alignment sheet, crossing sheets, PO details etc.)	2	2
B	**Uploading of welding documents**		
	Uploading of documents up to welding for 20% length	2	4
	Uploading of documents up to welding for 40% length	2	6
	Uploading of documents up to welding for 60% length	2	8
	Uploading of documents up to welding for 80% length	2	10
	Uploading of 100% complete documents up to 100% welding	2	12
C	**Uploading of lowering documents**		
	Uploading of documents up to lowering for 20% length	3	15
	Uploading of documents up to lowering for 40% length	3	18
	Uploading of documents up to lowering for 60% length	3	21

	Uploading of documents up to lowering for 80% length	3	24
	Uploading of 100% complete documents up to lowering for 100% length	3	27
D	**Uploading of Hydrotesting documents**		
	Uploading of documents up to hydrotesting for 20% length	3	30
	Uploading of documents up to hydrotesting for 40% length	3	33
	Uploading of documents up to hydrotesting for 60% length	3	36
	Uploading of documents up to hydrotesting for 80% length	3	39
	Uploading of 100% complete documents up to Hydrotesting for 100% length	3	42
E	**Uploading of all mainline documents including mechanical completion and commissioning reports**	2	44
F	**Uploading of documents related to Stations/ terminals**		
	Uploading of all documents related to Civil	3	47
	Uploading of all documents related to Electrical	2	49
	Uploading of all documents related to Instrumentation	2	51
	Uploading of all documents related to Fire fighting	2	53
	Uploading of all documents related to SCADA & Telecom	2	55
	Uploading of all documents related to Cathodic Protection	2	57
	Uploading of all documents including as-built documents, manuals, drawings etc.	2	59
G	**Uploading of all documents related to all crossings**	1	60
H	**Uploading of documents related to ROU**		
	Uploading of Landowner records, Village Maps, Cadastral Maps, Notifications, 3(1), 6(1)	2	62
	Updation of Cadastral Docs	2	64

	Compensation records	1	65
	Graphical representation of ROU data on GIS layer	2	67
I	**Auto-generation of alignment sheets**		
	Auto- generation of alignment sheets based on pre-construction survey data	1	68
	Auto- generation of as-built alignment sheets based on as-built survey data and GPS co-ordinates	1	69
J	**Web Based GIS**		
	Web GIS Hosting & pre-configuration	1	70
	GIS - Base Map	1	71
	Pipeline Route	1	72
	Cadastral Layer	2	74
	Construction data	2	76
	Final handing over of GIS application and acceptance by CLIENT	3	79
K	**Material Management**		
	Updation of PO details	2	81
	Updation of vendor documents, inspection documents, etc.	2	83
	Updation of all GRVs	2	85
	Updation of all SIVs	2	87
	Reconciliation and updation of all documents related to material management (including all IMIR, TC, IRN etc.)	2	89
L	**Training of client personnel**	1	90
M	**Completion of all activities as per scope of work, integrating & loading data on CLIENT GIS, installation in CLIENT's server & handing over of complete system to CLIENT**	10	100

Note:

i) In case a certain milestone is not applicable for a certain part, then payment corresponding to that milestone may be made along with the next applicable milestone or as decided by Engineer-in-charge.

Note: Any further breakup of each activity for the payment purpose can be done depending upon the site situation/ requirement and Recommendation by Engineer-In-Charge and Approval of Construction-In-Charge.

5.0 PAYMENT METHODOLOGY

5.1 The contractor shall raise invoices on fortnightly basis. Bidder shall enclose all documents as per check list issued by PMC/ IGGL. However, EIC may authorize payments for bills more frequently, i.e., periodicity of less than fortnight, depending on site requirements.

5.2 After receipt of complete RA Bill as per terms and conditions of the contract and duly certified by Engineer-in-Charge (EIC)/ PMC, on-account payment equivalent to seventy percent (70%) of the net payable certified amount of the RA Bill will be released to the contractor within a period of 07 working days from submission of certified bill by PMC to IGGL. The balance amount will be released within a period of 15 days from submission of certified bill by PMC to IGGL"

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5.3 IGGL has introduced the computerized Bill Watch system whereby the contractor will be issued a receipt at the time of the submission of the bills. The contractor can see the status of their bill on IGGL's website.

5.4 Employer will release payment through e-payments only as detailed in the Bidding Document.

5.5 Further break-up of Lumpsum Prices, if deemed necessary for any progressive payment of individual item may be mutually arrived at between Engineer-in-Charge and the Contractor.

5.6 All payments against running bills are advance against the work and shall not be taken as final acceptance of work / measurement carried out till the final bill.

5.7 Bills shall be raised by contractor in line with check list attached in Tender document.

5.8 Contractor shall submit No Claim Certificate, No Dues Certificate and Indemnity Bond along with final bill. The Format for No Claim certificate and Indemnity Bond are enclosed elsewhere in the tender.

SPECIFICATION
FOR
QUALITY ASSURANCE SYSTEM REQUIREMENTS

(Annexure - 6 to SCC)

(For Details – Refer our Technical Specification No. MEC/S/05/62/66 of the same enclosed in Vol-II of the Tender)

STANDARD SPECIFICATION
FOR
HEALTH, SAFETY AND ENVIRONMENTAL (HSE) MANAGEMENT AT CONSTRUCTION SITES

(ANNEXURE – 7 to SCC)

(FOR DETAILS – REFER OUR TECHNICAL SPECIFICATION NO. MEC/S/05/21/65 OF THE SAME ENCLOSED IN VOL-II OF THE TENDER)

CONDITIONS FOR ISSUE AND RECONCILIATION OF MATERIAL

(ANNEXURE – 8 to SCC)

ANNEXURE-8 TO SCC

1.0 CONDITIONS FOR ISSUE OF MATERIALS

Whenever any material is issued by Owner, following conditions for issue of material in addition to other conditions specified in the contract shall be applicable:

1.1 Necessary indents will have to be raised by the Contractor as per procedure laid down by the Engineer-in-Charge from time to time, when he requires the above material for incorporation in permanent works.

1.2 Materials will be issued only for permanent works and not for temporary works, enabling works etc. unless specifically approved by the Engineer-in-Charge and the same shall not be taken into account for the purpose of materials reconciliation.

1.3 The Contractor shall bear all other cost including lifting, carting from issue points to work site/Contractor's store, custody and handling etc. and return of surplus/serviceable scrap materials to Owner's storage points to be designated by the Engineer-in-Charge etc. No separate payment for such expenditure will be made.

1.4 No material shall be allowed to be taken outside the plant without a gate pass.

1.5 The Contractor shall be responsible for proper storage, preservation and watch & ward of the materials.

1.6 RETURN OF UNUSED MATERIAL

1.6.1 All unused/scrap materials shall be the property of the Owner and shall be returned in good and acceptable condition size wise, category wise by the Contractor at his own cost to Owner's Store(s).

1.6.2 No credit will be given to the Contractor for return of scrap. The Contractor should quote the rates accordingly.

1.6.3 In case the Contractor fails to return unused/scrap materials, then recovery for such quantity of materials, not returned by the Contractor shall be affected at following penal rates from the Contractor's bills or from any other dues of the Contractor to the Owner. Contractor shall make his own arrangements for weighing the off cuts to be returned to Owner's stores.

1.6.4 Penal Rates for non- return / return of materials:

Sl.No.	Material	Penal Rates
(a)	Penal rate for non return of	Issue Rate + 25%

		accountable scrap	or Landed Rate + 25% (in case issue rate are not indicated in the contract)
	(b)	Penal rates for non return of Unused material/excess scrap	Twice the Issue Rates or Twice the Landed Rates (in case Issue Rates are not indicated in the Contract)
	(c)	Penal rate for return of excess scrap	Issue Rate + 75% or Landed Rate + 75% (in case issue rate are not indicated in the contract)
	(d)	Penal rate for return of excess serviceable materials	Issue Rate + 50% or Landed Rate + 50% (in case issue rate are not indicated in the contract)
	(e)	Penal rate for issuance of unplanned OFC jointing kits	Issue Rate + 25% or Landed Rate + 25% (in case issue rate are not indicated in the contract)

NOTE: 1) Landed Rate shall be arrived from the latest Purchase Order of respective material received at site by Owner/ MECON.

2) In case different penal rates have been indicated in the Contract (based on Project requirement), the same will supersede the above rates.

2.0 PIPING MATERIALS

2.1 All pipes shall be issued in available lengths/shapes and no claims for extra payments on account of issue of non-standard length & shape will be entertained. Pipes shall be issued on linear measurement basis. All valves, flanges, fittings etc. shall be issued on number(s) basis. Contractor shall store the materials in such a way so as to avoid mixing of different types of material and shall maintain complete identification and traceability at all times.

2.2 The scrap allowance for pipes issued by the Owner shall be 3% (2½% accountable + ½% non accountable) of the actual consumption as incorporated in the works.

2.3 All pipes in length of 2 meters and above shall be considered as serviceable material provided the material is in good and acceptable condition and has clear identification and traceability (Manufacturer's name, heat number/batch number and test certificates). Pipes in lengths less than 2 m shall be treated as scrap.

2.4 For the non-account of pipes drawn by the Contractor over and above the actual consumption as determined by the Engineer-in-Charge, plus 3% (2½% accountable + ½% non accountable) thereof to cover the scrap allowance, recovery at penal rate shall be effected from the Contractor's bill(s) or from any other dues of the Contractor to the Owner.

2.5 All unused/scrap pipes, valves, flanges, forged fitting like elbows, reducers tees shall be returned by the Contractor category wise duly cleaned, greased and spec. marked at his own cost to Owner's stores. In case the Contractor fails to do so then recovery for such quantity of pipes not returned by the Contractor at the penal rates shall be effected from the Contractor's bill(s) or from any other dues of the Contractor to the Owner.

3.0 EQUIPMENT

Various equipment/materials intended for the installation will be received by Owner in unpacked, skid mounted, crated, packed or loose condition and will be stored in the warehouses and open yards. In general, materials will be issued to the Contractor in 'as received' condition. It will be the Contractor's responsibility to draw, load and transport all materials from Owner's designated places of issue to the point of installation and return all packing materials like steel frames, wooden boxes/scrap etc. to Owner's stores.

All materials supplied by the Owner shall be duly protected by the Contractor at his own cost with appropriate preservative like primer, lacquer coating, grease etc. as required.

4.0 CABLES

4.1 Appropriation of cables shall be done as follows:

4.1.1 All the surplus and serviceable cables out of the cables quantity(ies) issued by the Owner to the Contractor shall be returned by the Contractor to the Owner's store in good condition and as directed by the Engineer-in-Charge.

4.1.2 The Contractor shall be allowed a cutting/wastage allowance of 1.5% for power cables and 3% for the control cables. This cutting/wastage allowance shall be computed on the length of cables actually laid, measured and accepted.

4.1.3 All cables being returned to store should carry Aluminium sheet tags indicating the size & type of cable. Cables of less than 15 meters length will be termed as scrap. Cables of lengths 15M and above shall be termed as serviceable material & shall be returned size wise and category wise to the Owner's store in wooden drums. Cables of serviceable length being returned to stores in drum(s) shall be accepted only after Megger value continuity test and physical measurement is carried out by the Contractor to the satisfaction of Engineer-in-Charge. Empty cable drums and major

packing material (as decided by Engineer-in-charge) shall be Owner's property and shall be returned to Owner's Store/designated place without any additional cost.

4.1.4 While carrying out material appropriation with the Contractor, the above points will be taken into account. All serviceable materials returned by the Contractor (size wise & category wise) shall be deducted from the quantity(ies) issued to the Contractor for the respective sizes. Scrap generated for power cable and control cable shall also be returned to Owner's store on Lot basis.

4.1.5 Material appropriation shall be done & allowable scrap quantity calculated. The wastage generated by the Contractor in excess of the allowable percentage shall be charged at the penal rates.

5.0 LINE PIPES

5.1 All coated line pipes as per Line Pipe specifications shall be issued on linear measurement basis. The line pipes shall be issued in available lengths and shapes and no claim for extra payment on account of issue of non-standard length and shape will be entertained. Contractor shall store and maintain the line pipes in proper manner to avoid mixing of different classes of pipes. Contractor shall maintain complete identification and traceability at all times. All cut pieces when returned to Owner's storage points after bevelling, shall be considered as serviceable material provided:

5.1.1 Corrosion Protection Coating is intact.

5.1.2 Pipe pieces have pipe specifications, manufacturer's logo/name and heat number duly authenticated with hard stamp of the authorized inspector as per approved procedure.
All cut pieces of pipes measuring less than 2 M will be treated as wastage/scrap.

5.2 For the purpose of accounting of coated line pipes, following allowances shall be permitted:

a)	**Unaccountable wastage**	
	- Upto 100Km	**0.1%**
	- 101 to 500 Km	**0.07%**
	- Beyond 500 km	**0.05%**
b)	**Scrap (All cut pieces of pipes measuring less than 2 Meter)**	**0.25%**
c)	**Serviceable materials (All cut pieces of pipe measuring 2 Meter and above)**	**0.5%**

Note:
1) Retuned pipe having length between 11.5 m and 12.5 meter shall be considered full length pipe.

2) Line pipes issued by the Owner/Consultant to the Contractor with lengths between 10.0 m and 11.5 m shall be considered full-length pipes upon their return by the Contractor during material reconciliation, provided that the identity of the returned pipes is confirmed through verification of the corresponding heat numbers.

Scrap shall be accounted at actuals as per site assessment subject to maximum limits as stated above.

The percentage allowance shall be accounted on the basis of pipe book chainage for main pipeline

5.2.1 Material appropriation shall be done & allowable scrap quantity calculated. The wastage generated by the Contractor in excess of the allowable percentage shall be charged at the penal rates as given in the contract.

5.3 **Reconciliation of Line Pipe issued to contractor on account of fabrication of LR bends shall be dealt separately. Justification/calculation of scrap and other wastage shall be submitted to EIC for their review and further clearance.**

If Scrap/wastage generated by the Contractor found in excess with respect to approved justification/calculation, penal rates shall be charged for excess scrap/wastage in line with the provision of contract. However, decision of EIC shall be final and binding to the contractor.

6.0 OPTICAL FIBRE CABLE

For the purpose of accounting of optical fibre cable, all cut pieces measuring in length of 40 m and above when returned to Owner's storage points shall be treated as serviceable materials. All cut pieces of cable measuring less than 40 M will be treated as scrap.

Cables returned in original drum (measuring 750m and above) with Optical Time Domain Report (OTDR) shall be considered as unused material.

For the purpose of accounting of OFC (Optical Fibre Cable) following allowances shall be permitted:

(i)	Unaccountable wastage	0.5%
(ii)	Scrap (All cut pieces of cables measuring less than 40 M)	0.25%
(iii)	Serviceable material (measuring 40M and above)	0.25%

Material appropriation shall be done & allowable scrap quantity calculated. The wastage generated by the Contractor in excess of the allowable percentage shall be charged at the penal rates as given in the contract.

7.0 OFC JOINTING KITS

The Contractor shall make a schedule for use of cable jointing kits and get the same approved from Engineer-In-Charge. The quantity mentioned in this schedule shall be termed as 'planned' usage quantity which shall be issued to the Contractor. However, any jointing based on site requirements as decided by Engineer-In-Charge shall be included in planned quantity.

Any unplanned jointing required to be carried out by the Contractor due to reasons not attributable to Owner/ PMC shall be issued from spare quantity, if available with Owner. Such unplanned OFC jointing kits shall be charged from the Contractor at penal rates as per **clause 1.6.4** above.

LIST OF MINIMUM EQUIPMENTS REQUIRED TO BE OWNED BY BIDDER

(Annexure- 9A of Special Conditions of Contract)

(Refer Annexure to Technical BEC)

LIST OF MINIMUM EQUIPMENT TO BE DEPLOYED BY THE BIDDER

(Annexure- 9B of Special Conditions of Contract)

ANNEXURE-9B TO SCC

List of Minimum Equipment to be Deployed by the Bidder

CATEGORY-1

S. No.	Equipment Description	Total Qty (in Nos.)	For 5% Mobilization advance
1.	Dozer with Ripper – D7/ D6 or Equivalent	3	1
2.	Excavator / Back Hoe-Ex 280 & Above or Equivalent	12	2
3.	Excavator / Back Hoe-Ex 200 & Above or Equivalent	6	4
4.	Pipe Layer/Side Boom – 60 T & Above Capacity	12	2
5.	Pipe Layer/Side Boom – 40 T & Above Capacity	12	2
6.	JCB (Tyre Mounted Excavator)	3	2
7.	Farana/ Hydra (8 – 12 MT)	5	4
8.	DG Welding Machines	24	8
9.	Semi Auto Welding Machines	24	8
10.	Pipe bending Machine	1	
11.	Horizontal Auger Boring Machine with rock breaking tool	As required	
12.	Pipe Clamp (Pneumatic/ Hydraulic) – Internal	6	4
13.	HDD Rig with All Equipments & Accessories (Min. 96 T)	2	
14.	X-Ray M/C – Internal Crawler	3	1
15.	X-Ray M/C – External	3	1
16.	Gamma Source	2	
17.	Water Lifting Pump (400 m^3/hr. & above)	4	
18.	Filling Pumps (400 to 1000 m^3/hr)	2	
19.	Pressurization Pump – Motorized	2	
20.	Air Compressor – (300CFM)	5	
21.	Air Compressor – (450/600/800 CFM)	3	
22.	Air Compressor – (1100 or above CFM)	2	

23.	D.G. Sets: 62.5 KVA to 200 KVA (inclusive of generators)	18	
24.	Blast Cleaning Machine	4	

CATEGORY-2

S. No.	Equipment Description	Total Qty (in Nos.)
1.	Bevel Cutting Machine –Manual	1
2.	Manual UT Machine	1
3.	Dewatering Pump	1
4.	Holiday Detector Unit	1
5.	Dead WT Tester	1
6.	Pipe/ Cable locator	1
7.	Pipe Clamp – External	1
8.	Pipe Trailers	1
9.	Mobile Workshop	1
10.	Rock Breaker	1
11.	Hand drill (pneumatic) for rock blasting	1
12.	Mud Mat (for working in Monsoon)*	As reqd.
13.	Induction/ Resistance Heating Equipment or LPG Multi torch	4
14.	Dozing Pump	2

Notes:

1) For equipments under **Category-1:** Bidders are required to submit the documentary evidence for Ownership/ Hiring/ Lease of equipments listed in this category.

   a) For Hired/ Lease Equipments: The documentary evidence shall be MOU from the hiring/ leasing agency of the equipment. Bidder shall be responsible for timely delivery of these equipments at the site at stipulated time.

   b) In case, some equipment under **Category-1** are owned by the bidder then the proof of ownership to be submitted. Proof of ownership will be either certificate from charted accountant for ownership and from charted engineer for good health and working condition or copy of purchase order.

2) For equipments under **Category-2**: No documents are required to be submitted along-with the bid. However, Bidder to indicate equipment as owned or hired for deployment purpose.

3) **Above quantities are inclusive of the quantities indicated in Annexure-9A to SCC.**

4) Based on availability of RoU / line pipe, Contractor shall propose minimum equipment to be deployed and the same shall be finalized 7 days prior to each month jointly by Section in-charge of IGGL, RCM of PMC and construction in-charge of Contractor. Further, Bidder shall be required to augment the above list with additional numbers/ categories of equipments, tools, tackles, as required and directed by Engineer-In-charge to complete the work within the completion time schedule and quoted price.

5) It has been envisaged that Contractor have to mobilize minimum above-mentioned equipment's in three spreads to work in three fronts simultaneously to adhere the contractual period timeline.

MINIMUM NO. OF SKILLED MANPOWER TO BE DEPLOYED

(Annexure-10 of Special Conditions of Contract)

ANNEXURE-10 TO SCC

MINIMUM NUMBER OF SKILLED MANPOWER TO BE DEPLOYED

Sl. No.	DESCRIPTION	Quantity (in Nos.)
1.	Construction Manager	1
2.	Spread-in-charge	3
3.	Planning engineer	2
4.	QA/ QC engineer	3
5.	Safety officer	3
6.	Qualified Surveyor	3
7.	Welding/ NDT engineer	3/3
8.	Discipline Engineers (Civil/ Mech./ Elec.)	3/3/2
9.	Foreman / Supervisor	15
10.	Liaison team	2
11.	Document controller / Account Officer (for line pipe)	1/1
12.	Store keeper / store in-charge	1/1
13.	Welder (Manual / Semi-automatic)	24
14.	Fitter	12
15.	Grinder	24
16.	Machine operator	As Required
17.	Blast cleaning crew	2
18.	Electrician / Machine mechanic	As Required
19.	Rigger	40
20.	Drivers	As Required
21.	Pipe bending crew	2
22.	Thrust/ Hor. Auger Boring crew	As required
23.	X-ray / Gamma Ray crew	2/2
24.	Hydro-testing crew	3
25.	Field joint coating crew	4
26.	Holiday testing crew	4
27.	HDD crew	1 (Refer Note 1)
28.	OFC jointing crew	2
29.	Civil survey crew (with equipment)	4
30.	Station civil works (carpenter/ bar-bender/ mason/ fitter etc.)	As Required
31.	Unskilled workers	45
32.	Station mechanical, pre-fabrication/ erection crew	5
33.	Electrical Works crew	2
34.	Instrumentation works crew	2

The above proposed list of skilled manpower is the minimum to be deployed by Contractor.

NOTES:-

(1) HDD equipment and Crew as required shall be deployed as per requirement/SOW finalized and as per instruction of EIC.

(2) The details of minimum manpower required to be mobilized by the execution contractor to complete the work within schedule is given above and is not exhaustive. Contractor is required to augment the above list with additional numbers/categories of workmen as required and directed by Engineer-In charge to complete the work within the completion time schedule and quoted price.

(3) For Magnetic cleaning and EGP, adequate equipment and crew shall be mobilized to complete the activity within the given time schedule and as approved by Engineer-in-charge.

(4) The Manpower as identified above should have required qualification and adequate relevant experience.

(5) Contractor shall mobilize Resident Construction Manager, QA/QC Engineer, Planning Engineer, Safety Officer who will be the permanent employees of the Contractor.

(6) CV of proposed Resident Construction Manager, QA/QC Engineer, Planning Engineer, Safety Officer & Welding/NDT Engineer to be submitted along with the bid. The experience should be related to execution of Hydrocarbon Transportation Pipeline laying. N**on deployment or unilateral withdrawal of key personnel by the contractor will attract recovery as per the hiring / recovery rates specified in Annexure-11 to SCC.**

(7) **Based on availability of ROU / front & line pipe, Contractor shall propose minimum manpower to be deployed and the same shall be finalized by construction-in-charge of IGGL/ PMC on monthly/quarterly basis. Further, Bidder shall be required to augment the above list with additional manpower, as required and directed by Engineer-In-charge to complete the work within the completion time schedule and quoted price.**

Note: These manpower are to be mobilized within 30 days of Go ahead given or as per written instruction from Engineer-in-Charge. Demobilization of these manpower shall be with approval of Engineer-in-Charge.

ANNEXURE-10A TO SCC

EXPERIENCE CRITERIA FOR KEY PERSONNEL TO BE DEPLOYED DURING CONSTRUCTION

1. The **Bidder must provide a detailed organisational chart** indicating the organisation or personnel and equipment for each phase of the Works. **CVs of main key persons shall be submitted by the Contractor along with bid** and replacement of any of these key persons after LOA issuance shall be approved by Owner / Owner's representative. Key persons shall be deployed during the entire duration of the work till completion of all works. Non deployment of key persons will be subject to recovery as defined elsewhere in the bid.

   Following key persons to be deployed during construction as a minimum:

Sl. No.	Position	Qualification & Knowledge	Experience	No. of Key Personnel (minimum)
1.	Construction Manager / Construction In-Charge/ Spread-In-charge	Degree / Diploma in Civil / Mechanical Engineering	At least 8 years' experience for Degree holder and 12 years for Diploma holder in Construction of Cross-country Hydrocarbon (Oil & Gas) pipelines. Out of the 8/ 12 years experience, at least 5/ 8 years experience must be in similar position in works related to construction of hydrocarbon pipeline projects.	As per **Annexure-10** to SCC
2.	Safety Officer	Degree / Diploma in Engineering / any discipline along with diploma in safety	At least 4 years of experience for Degree holder and 8 years for Diploma holder in Safety Management in construction of cross-country hydrocarbon pipelines & associated facilities.	
3.	QA/ QC Engineer	Degree/ Diploma in Mechanical Engineering	At least 6 years of experience for Degree holder and 10 years for Diploma holder in quality/ NDT management in construction of cross-country hydrocarbon pipelines & associated facilities.	

Sl. No.	Position	Qualification & Knowledge	Experience	No. of Key Personnel (minimum)
4.	Welding / NDT Engineer	Degree / Diploma in Mechanical Engineering	At least 7 years of experience for Degree holder and 10 years for Diploma holder in quality / NDT management in construction of cross-country hydrocarbon pipeline & associated facilities.	
5.	Planning Engineer	Degree / Diploma in Engineering / Project Management	At least 4 years of experience for Degree holder and 8 years for Diploma holder in project planning of hydrocarbon cross-country pipelines & associated facilities.	

2. This description is only binding upon the Contractor. Contractor must provide, at his own expense, all the necessary equipment, machinery and personnel even in addition to those indicated in the offer.

HIRING / RECOVERY RATE FOR DEPLOYMENT OF MANPOWER

(Annexure-11 of Special Condition of Contract)

ANNEXURE –11 TO SCC

HIRING / RECOVERY RATE FOR DEPLOYMENT OF MANPOWER

1. The Labour rates are "all inclusive". These rates include but are not limited to all payroll costs and allowances, payroll taxes, fringe benefits, protective and/or special clothing, construction supplies required for work of a nature included in this contract, overhead, profit insurance, transportation and travel time.

2. The rates are inclusive of providing hand tools and consumables such as electrodes, filler wire, gases, grinding wheels where the concerned category of labour is expected to use in execution of the job but exclusive of all major equipment and machineries.

3. The normal time labour rates shall apply for all hours worked upto eight (8) hours in a day and overtime rates shall apply for all hours worked in excess of eight (8) hours in one working day, Sunday and Public Holidays. The payment for part of the day shall be made on prorata basis.

Sl. No.	Classification for Personnel	Rates per day of Normal Hours (in Rs.)	Rate per hour OT, Sunday & Holiday (in Rs.)
1.	Foreman	2475	540
2.	Supervisor	2750	600
3.	Engineer	3500	775
4.	Gas Cutter	1155	250
5.	Grinder	1155	250
6.	Brick Mason	800	175
7.	Stone Mason	800	175
8.	Structural welder	1650	360
9.	Qualified Arc welder – manual / semi automatic	1980	330
10.	Qualified Arc welder – automatic	2250	490
11.	Welder helper	650	140
12.	Pipe Fitter /Bender	1000	220
13.	Structural Fitter	850	185
14.	Pipeline Fitter	1000	220
15.	Coater	850	185
16.	Mechanic	850	185
17.	Site Equipment / Machine Operator	850	185
18.	Electrician	1000	220
19.	Fabricator	1000	220

Sl. No.	Classification Personnel	Rates per day of Normal Hours (in Rs.)	Rate per hour for OT, Sunday & Holiday (in Rs.)
20.	Carpenter	800	175
21.	Plumber	800	175
22.	Painter	800	175
23.	Cable Jointer	800	175
24.	Instrumentation Technician	850	185
25.	Insulator	700	150
26.	Rigger	750	165
27.	Bhisti (water man)	650	145
28.	Heavy duty driver	1000	220
29.	Civil Surveyor	1750	385
30.	Document Controller	1000	220
31.	Account Officer	1500	330
32.	Store Keeper / Incharge	1000	220
33.	AUT Interpreter	5000	750
34.	Liasioning Team (2 persons)	2000	430
35.	Light duty driver	660	150
36.	Sand Blaster	735	165
37.	Qualified Surveyor	1750	385
38.	Unskilled Worker	650	140
39.	Construction Manager	10000	1000
40.	QA/QC / Safety / Planning / NDT Engineer / Spread-in charge/ Billing Coordinator	5000	750

(SIGNATURE OF BIDDER)

NOTES:-

1. Rates are final and Tenderer is to sign only without deviation.
2. In case of foreign bidder, conversion rate applicable on one day prior to price bid opening date published by the State Bank of India will be considered.

3. The recovery rates shall be as following:

   a) For Sl.No. 1-38; the rates provided above plus 20% (twenty percent)

   b) For Sl.No. 39 & 40; the rates provided above plus 50% (fifty percent)

EQUIPMENT HIRING/RECOVERY RATES
(Annexure-12 of Special Condition of Contract)

ANNEXURE – 12 to SCC

HIRING/RECOVERY RATE FOR EQUIPMENTS

Sl. No.	Equipment	HIRING / RECOVERY RATES (IN INR) (Per Day): 8 Hrs INCLUDING CONSUMABLES & FUEL
1	Excavator / Back Hoe-Ex 280 / 300 & Above or Equivalent	10,000
2	Excavator / Back Hoe-Ex 200 & Above or Equivalent	8,000
3	Pipe Layer/Side Boom – 70 T & Above Capacity	10,000
4	Pipe Layer/Side Boom – 60 T & Above Capacity	9,500
5	Pipe Layer/Side Boom – 40 T & Above Capacity	8,500
6	Pipe Bending Machine	7,500
7	Dozer with Ripper – D7/D6 or Equivalent	6,500
8	DG Welding Machines	1,800
9	Semi Auto Welding Machines	2,500
10	Dozer with Ripper – D8 or Equivalent	10,000
11	Hydra (upto 10 MT)	4,000
12	Hydra (above 10 MT – up to 25 MT)	5,000
13	Hydra (above 25 MT)	5,800
14	Horizontal Auger Boring Machine with Rock breaking tool	4,500
15	Pipe Clamp (Pneumatic/Hydraulic) – Internal	1,500
16	Tyre Mounted Cranes (above 10 and upto 30 MT)	7,500
17	Tyre Mounted Cranes (above 30 and upto 75 MT)	15,000
18	Tyre Mounted Cranes (above 75 MT)	25,000
19	X-Ray M/C – Internal Crawler	2,500
20	X-Ray M/C – External	2,500
21	Gamma Source	750
22	Water Lifting Pump (400 m^3/hr. & above)	900
23	Filling Pumps (400 TO 1000 M^3/HR)	950
24	Pressurization Pump – Motorized	3,500
25	Induction/Resistance Heating Equipment or LPG Multi Torch.	4,000
26	Air Compressor – (300CFM)	4,000
27	Air Compressor – (450/600/800 CFM)	4,200
28	Air Compressor – (1000-1500 CFM)	4,500
29	D.G. Sets : 62.5 KVA to 200 KVA (inclusive of generators)	5,000
30	Blast Cleaning Machine	500
31	Pipe Trailers (FB / Semi Low Bed)	7,000

Sl. No.	Equipment	HIRING / RECOVERY RATES (IN INR) (Per Day): 8 Hrs INCLUDING CONSUMABLES & FUEL
32	Mono drill crawler mounted	3,500
33	Hand drill(pneumatic)for rock blasting	2,500
34	Rock breaker attachment	4,000
35	Dozing Pump	500
36	Bevel Cutting Machine –Manual	750
37	UT Machine with operator	1,500
38	Dewatering Pump	1,500
39	Holiday Detector Unit	500
40	Dead WT Tester	500
41	Dumper / Tippers	4,000
42	Pipe locator	500
43	Pipe Clamp – External	600
44	Pipe Trailer for Coated Line Pipe	7,500
45	Rock Breaking Machine with Excavator	10,000
46	Grinding machine	250
47	Gas cutting set with cylinders	750
48	Trucks (upto 9 T) with driver	5,000
49	Car/Jeep with driver (5 Seater)	2,000
50	Car/Jeep with driver (7 Seater)	2,500
51	Tractor with trolley	2,000
52	Tripod with 5 Tons Chain Pulley Block	400
53	Pneumatic Drill (Tractor mounted for blasting) with Compressor	5,000
54	JCB Excavator	8,000
55	JCB Excavator with rock breaking tool	12,000
56	Moling machine (Manual)	3,000
57	Moling machine (Machine)	5,000
58	Fusion jointing Machine	5,000
59	Concrete mixer 0.25 to 0.40 Cum with hopper or as required.	1,000

NOTES:-

1. 1 Rates are inclusive of operators / drivers / Fuel /POL and consumables.
2. Rates are inclusive of contractor's overheads & profit.
3. In case of foreign bidder, conversion rate applicable on one day prior to price bid opening date published by the State Bank of India will be considered.
4. The recovery rates shall be the rates provided above plus 20% (twenty percent).

5. Hiring rates of above equipments are for one shift (i.e. 8 Hrs). Hiring rates for two shifts i.e. 16 hrs are 1.25 times of above rates & hiring rates for three shifts i.e. 24 hrs are 1.5 times of above rates

HIRING / RECOVERY RATE FOR HDD EQUIPMENTS

Sl. No.	Equipment	HIRING/ RECOVERY RATES (IN INR) (Per Day)- 24 Hrs INCLUDING CONSUMABLES & FUEL
1	HDD Rig with all Equipments & Accessories (Cap upto 50 T) (Soft Strata)	20,000
2	HDD Rig with all Equipments & Accessories (Cap upto 50 T) (Rock Strata)	25,000
3	HDD Rig with all Equipments & Accessories (Cap above 50 T and upto 100 T) (Soft Strata)	30,000
4	HDD Rig with all Equipments & Accessories (Cap above 50 T and up to 100 T) (Rock Strata)	40,000
5	HDD Rig with all Equipments & Accessories (Cap above 100 T and up to 200 T) (Soft Strata)	80,000
6	HDD Rig with all Equipments & Accessories (Cap above 100 T and up to 200 T (Rock Strata)	1,00,000
7	HDD Rig with all Equipments & Accessories (Cap above 200 T and up to 350T) (Soft Strata)	1,15,000
8	HDD Rig with all Equipments & Accessories (Cap above 200 T and up to 350T (Rock Strata)	1,40,000
9	HDD Rig with all Equipments & Accessories (Cap above 350 T) (Soft Strata)	1,50,000
10	HDD Rig with all Equipments & Accessories (Cap above 350 T) (Rock Strata)	1,80,000

Notes:

1. Rates are inclusive of operators / drivers / Fuel /POL and consumables.
2. Rates are inclusive of contractor's overheads & profit.
3. In case of foreign bidder, conversion rate applicable on one day prior to price bid opening date published by the State Bank of India will be considered.
4. The recovery rates shall be the rates provided above plus 20% (twenty percent).

SIGNATURE OF THE BIDDER: _____

NAME OF THE BIDDER: _____

ANNEXURE – 13 to SCC

LIST OF EQUIPMENT TO BE MAINTAINED DURING EXTENDED STAY PERIOD

COST OF EQUIPMENT (1 MONTH)

Sl. No.	Equipment Detail	Total minimum equipment	Unit Rate /day	Total Rate /day
	CATEGORY-1	**Qty. (in No.)**	**(in INR)**	**(in INR)**
1	Excavator / Back Hoe-Ex 200 & Above or Equivalent	2	8000	16000
2	Pipe Layer/Side Boom – 40 T & Above Capacity	1	8500	8500
3	Pipe Bending Machine as per line size	1	7500	7500
4	Dozer with Ripper – D7/D6 or Equivalent	1	6500	6500
5	DG Welding Machines	4	1800	7200
6	Hydra (8 – 10 MT)	1	4000	4000
7	Pipe Clamp (Pneumatic/Hydraulic) – Internal	1	1500	1500
8	X-Ray M/C – Internal Crawler	1	2500	2500
9	X-Ray M/C – External	1	2500	2500
10	Gamma Source	1	750	750
11	Water Lifting Pump (400 m^3/hr. & above)	1	900	900
12	Filling Pumps (400 TO 1000 M^3/HR)	1	950	950
13	Pressurization Pump – Motorized	1	3500	3500
14	Air Compressor – (300CFM)	1	4000	4000
15	D.G. Sets : 62.5 KVA to 200 KVA (inclusive of generators)	2	5000	10000
16	Blast Cleaning Machine	1	500	500
17	Pipe Trailers (FB / Semi Low Bed)	1	7000	7000
18	Hand drill(pneumatic) for rock blasting	2	2500	5000
19	Dozing Pump	1	500	500
			Total per day	**89300**
			Total per Month limiting to	**2679000**

Note :

1. The above-month wise cost is for pipeline size 24” NB and above diameter considering one crew independent of pipeline length.
2. The above equipments shall be in working condition and the rates are all inclusive but not limited to Operators, overheads & profits etc.
3. In case of shortfall of equipment listed herein above the recovery rates shall be the rates provided above plus 20% (twenty percent) effected and above monthly compensation shall be reduced accordingly. Further, no additional charges shall be paid to contractor for keeping addition no. of equipments.
4. Rates per day mean 24 hours

ANNEXURE-14 TO SCC

LIST OF MANPOWER TO BE MAINTAINED DURING EXTENDED STAY PERIOD

COST OF MANPOWER - 1 MONTH

	Description	Qty. (In No.)	Rate / Day (In INR)	Total / Day (In INR)
1.	Resident Construction Manager / Section In-charge	1	10000	10000
2.	Planning engineer	1	5000	5000
3.	QA/ QC engineer	1	5000	5000
4.	Safety officer	1	5000	5000
5.	Qualified Surveyor	1	1750	1750
6.	Welding / NDT engineer	1	5000	5000
7.	Discipline Engineer's (Civil/ Mech.)	2	3500	7000
8.	Foreman / Supervisor	4	2750	11000
9.	Civil surveyor / liaison team consisting of 2 (two) members	1	1750	3500
10.	Document controller / Account Officer (for line pipe)	1	1000	1000
11.	Store keeper / store in-charge	1	1000	1000
12.	Welder	8	1980	15840
13.	Fitter	4	1000	4000
14.	Grinder	4	1155	4620
15.	Blast cleaning crew consisting of 4 (four) persons (i.e.; sand Blaster + 03 unskilled worker)	1	2685	2685
16.	Electrician / Machine mechanic	2	1000	2000
17.	Rigger	4	750	3000
18.	Pipe bender	1	1000	1000
19.	X-ray / Gamma Ray crew Consisting 2 (Two) persons (i.e.; Supervisor ANST level-I + unskilled worker	1	3400	3400
20.	Hydro-testing crew consisting 04 persons (i.e.; Hydrotesting Supervisor + Filler+ 02 unskilled worker)	1	5050	5050
21.	Field joint coating crew consisting 03 persons (i.e.; Insulator -02 Nos + 1 Unskilled Worker)	1	2050	2050
22.	Holiday testing crew consisting 02 persons (i.e.; Insulator + Unskilled Worker)	1	1350	1350
23.	OFC jointing crew consisting 2 Persons (Cable Jointer + Unskilled Worker)	1	1450	1450

24.	Civil survey crew (with equipment) consisting 02 persons (i.e.; Qualified surveyor + unskilled Worker)	.1	2400	2400
25.	Unskilled workers	5	650	3250
			Total per day	**107345**
			Total per Month limiting to	**3220350**
NOTE:				

1. The above month wise cost is for pipeline size 24" considering one crew independent of pipeline length.
2. The above rates are all inclusive but not limited to all payroll costs and allowances, payroll taxes, fringe benefits, protective and/or special clothing, construction supplies required for work of a nature included in this contract, overhead, profit insurance, transportation and travel time etc.
3. The rates are inclusive of providing hand tools, Personal Protection equipment (PPE) and consumables etc.
4. In case of shortfall of manpower listed herein above the recovery rates shall be the rates provided above plus 20% (twenty percent) effected and above monthly compensation shall be reduced accordingly. Further, no additional charges shall be paid to contractor for keeping addition no. of manpower.
5. Rates per day mean 24 hours.

ANNEXURE – 15 to SCC

LIST OF CAMP / OFFICE / STORAGE YARD / VEHICLE ETC TO BE MAINTAINED DURING EXTENDED STAY PERIOD

COST OF CAMP / OFFICE / STORAGE YARD / VEHICHLE ETC.

	Description	Qty (in No.)	Rate / Month (in INR)	Total / Month (in INR)
1.	Camp Office (minimum 2000 sq. ft.) with all required logistics and office infrastructure	1	60000	60000
2.	Project Vehicle, i.e., Car/ Jeep (inclusive of all cost on account of consumable, fuel, driver and maintenance)	2	50000	100000
3.	Storage Yard (minimum 1.0 acre) with all required logistics and infrastructure etc.	1	100000	100000
NOTE	**Total per Month limiting to**			**260000**

1. The above month wise cost is for pipeline size 24" NB diameter considering one crew independent of pipeline length.
2. The above rates are inclusive of all type of charges related to hiring, development and maintenance of storage yard / camp office.
3. In case of shortfall in respect of quantity & size from above list the recovery shall be made on pro rata basis based on above rates plus 20% (twenty percent) effected and above monthly compensation shall be reduced accordingly. Further, if contractor keeps more nos. of camp / office / storage yard / vehicle etc in addition to qty. & size as specified in above table, no additional charges shall be paid to contractor.

SECTION VI

PARTICULAR JOB SPECIFICATION

PARTICULAR JOB SPECIFICATION

PIPELINE LAYING WORKS

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1.0 INTRODUCTION

1.1 Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, IGGL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. As per Hydrocarbon Vision 2030 for North East India, North East Gas Grid (NEGG), a natural gas pipeline network, is being set up to connect the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni- Guwahati Gas Pipeline. The project is being implemented in three phases based on the requirement of statutory clearance, route terrain, linkage with Highway corridor widening works, difficulty in work execution etc. for the development of a gas-based economy in North-Eastern India.

The Duliajan Feeder Line (DFL) is proposed for expansion of NEGG up to Duliajan for transporting Natural gas from Duliajan to Jorhat along with associated facilities. DFL shall connect gas sources of OIL at Duliajan and BCPL Lepetkata, with a provision to connect gas sources at HOEC Dirok & Antelopus Duarmara, OILMAX Amguri, OILMAX Tiphuk, ONGC Geleki/ Lakwa fields in the future.

M/s Indradhanush Gas Grid Limited (IGGL) has awarded MECON LIMITED the job of providing engineering & project management consultancy services of laying 24” NB x 180 Kms. (approx.) of Duliajan Feeder line for connecting Duliajan to NEGG Jorhat for transportation and distribution of Natural Gas in the region.

1.2 Present tender envisages laying of 24” NB x 174.236 Km (approx.) main pipeline from Duliajan to Jorhat. Pipeline will originate from OIL’s CGGS Madhuban (Duliajan) at Ch. 0.00 Km to Receiving Terminal at existing SV-14 (Jorhat) of GNPL. The Lepetkata spurline will originate from DT at BCPL Lepetkata source to Receiving terminal cum injection point at SV-3 of Duliajan Feeder Line.

The schematic of the pipeline network is enclosed as drawing no. MEC/05/28/E/0085/M/1021 Rev-1.

1.3 This document covers details of work tendered, scope of work, scope of supply and other requirements pertaining to pipeline and associated facilities. All works and clauses of this document shall be applicable to all sections unless specifically mentioned otherwise.

Details of associated Civil, Architecture, Structural, Mechanical, Piping, Instrumentation, Cathodic Protection, Telecom, Electrical, Corrosion Monitoring and Fire protection works etc. are covered elsewhere in the Bid document.

2.0 WORK TENDERED

Work tendered as a part of this Bid document consists of supply of materials as required, installation, testing, pre-commissioning of pipeline, preservation, drying and commissioning. The work includes installation of pipeline of required diameter and

piping works at despatch terminal, SV stations, IP station, receiving terminal and all associated mechanical, civil, architectural, structural, cathodic protection, electrical, instrumentation, corrosion monitoring, PIMS, telecom, fire protection system, TCP and PCP works at Stations along the route etc.

2.1 The details of proposed work are as under:

2.1.1 The brief scope of work, broadly consist of Laying, Testing and Commissioning of 24"NB x 174.236 Kms (approx.) and 24" NB x 6.027 Kms (approx.) pipeline in the Indian state of Assam including all associated works for transportation of Natural Gas/ R-LNG.

The pipeline facilities envisaged are described briefly herein below:

Duliajan Feeder Line (Duliajan to Jorhat Pipeline)	Pipeline from Despatch Terminal at OIL's CGGS Madhuban (Duliajan) to Receiving Terminal at SV-14 of GNPL (Jorhat) (24" NB x 174.236 Km approx.) in the state of Assam.
Stations/ Terminals	i. Despatch Terminals at Duliajan (Ch: 0.00 Km), Madhuban Tiniali, Tehsil: Duliajan, Distt: Dibrugarh (Assam)
	ii. Sectionalizing Valve Stations along the mainline (09 nos.) SV-01 at Ch: 16.0 Km (approx.)* SV-02 at Ch: 32.0 Km (approx.)* SV-03 cum Lapetkata Injection point at Ch: 48.0 Km (approx.)* SV-04 at Ch: 64 Km (approx.)* SV-05 at Ch: 80 Km (approx.)* SV-06 at Ch: 112 Km (approx.)* SV-07 at Ch: 128 Km (approx.)* SV-08 at Ch: 144 Km (approx.)* SV-09 at Ch: 160 Km (approx.)*
	iii. Future Tap-off point for BCPL Lakwa at Ch. 85 Km (approx.)
	iv. Intermediate Pigging Station IP-01 at Ch. 96 Km (approx.) *
	v. Receiving Terminal at SV-14 GNPL (Ch. 174.236 Km approx.), Vill: Kumar Gaon, Tehsil: Jorhat, Distt: Jorhat (Assam)

Note: *- The chainages of SVs and IP are tentative & for planning purpose only. The SV and IP locations have been decided without any consideration to existence of any all-weather road. The final location of SVs and IP shall be decided based on land availability near to existing all-weather road.

Duliajan Feeder Line (Duliajan to Jorhat Pipeline)	Pipeline from BCPL Lepetkata Source to Lepetkata (24" NB x 6.027 Km approx.) in the state of Assam.

Stations/ Terminals	i. Despatch Terminals at Lapetkata (0.00 Km), Village: Lepetkata Kachari Gaon, Tehsil: Lepetkata, Distt: Dibrugarh (Assam)
	ii. Receiving Terminal cum Injection Point at SV-3, Distt: Dibrugarh (Assam)

Scope under above referred Pipeline mainly consists of following:

The brief scope of work includes supply of materials (other than free issue material), pipe laying work including but not limited to Construction Management, HSE & Quality Management, Survey, ROU management, clearing of ROU, grading, stringing, bending, welding (manual / Semi-automatic/ Automatic), trenching, joint coating, lowering, crossings, crossings by HDD (wherever specified), Tie-ins, NDT and destructive testing, backfilling, laying of pipeline along-with OFC & HDPE ducts, TCP works, site restoration, hydro-testing, dewatering, swabbing, MGP & EGP, drying, pre-commissioning, commissioning and Gas-in of 24" NB diameter pipeline including, Cathodic protection, Corrosion monitoring works, Electrical works &Telecom works, Pipeline information Management System (PIMS), Videography including all associated works.

Scope under above referred Pipeline mainly consists of following:

- The brief scope of work includes supply of materials of all sizes (other than line pipe and metering skid which shall be issued as free issue material), pipe laying work including but not limited to Construction Management, HSE & Quality Management, Survey, ROU management, clearing of ROU, grading (wherever required), stringing, bending, welding (manual / Semi-automatic/ Automatic), trenching, joint coating, lowering, crossings, crossings by HDD (wherever specified), Tie-ins, NDT and destructive testing, backfilling, laying of pipeline along-with OFC & HDPE ducts, site restoration, hydro-testing, dewatering, swabbing, MGP & EGP, drying, pre-commissioning, commissioning and Gas-in of 24" Dia. pipeline including, Cathodic protection works, Civil works (including building works), Architectural works, Structural works, Instrumentation works, Corrosion monitoring works, Electrical works & Telecom works, Firefighting works, Pipeline information Management System (PIMS), Videography, hot tapping and stoppling etc. including all associated works.
- Laying, Testing and Commissioning of 24" NB x 174.236 Kms (Approx.) pipeline from Dispatch terminal at OIL's CGGS Madhuban (Duliajan) to Receiving terminal at existing SV-14 of GNPL.
- Laying, Testing and Commissioning of 24" NB x 6.027 Kms (Approx.) pipeline from Dispatch terminal at BCPL Source at Lepetkata to Receiving terminal cum injection point at SV-03 of mainline.
- Entire works at Dispatch Station located at OIL's CGGS Madhuban including installation of scrapper trap, insulating joints, flow tee, all valves, equipment, fittings, metering facility (as required), all piping works and other facilities and all associated mechanical, civil (including building, boundary wall, pavement and supports etc.), architectural works, structural works, Electrical & instrumentation works, telecom works (OFC Duct), Fire Protection system works, Corrosion monitoring works, Cathodic protection works etc.

- Entire works at SVs (SV-01 to 09) including installation of insulating joints, flow tee, all valves, equipment, fittings, all piping works and other facilities and all associated mechanical, civil (Building works, Brick boundary wall, Guard room, Pavement and supports etc.), Architectural and structural works, Electrical & instrumentation works, telecom works (OFC Duct), Fire protection system works, Corrosion monitoring works, Cathodic protection works etc.

- Entire works at Intermediate Pigging Station (IP-01) including installation of scrapper trap, insulating joints, flow tee, all valves, equipment, fittings, all piping works and other facilities and all associated mechanical, civil (including building, pavement and supports etc.), architectural works, structural works, Electrical & instrumentation works, telecom works (OFC Duct), Fire Protection works, Corrosion monitoring works, Cathodic protection works etc.

- Entire works at future tap-off for Lakwa (Ch. 85.0 Km approx. including installation of insulating joints, all valves, fittings, all piping works and other facilities and all associated mechanical, civil (Pavement and supports etc.), Architectural and structural works (fencing), Electrical & instrumentation works, telecom works (OFC Duct), Fire protection system works, Corrosion monitoring works, Cathodic protection works etc.

- Entire works at Receiving Station at existing SV-14 (Jorhat) of GNPL project including installation of scrapper trap, insulating joints, flow tee, all valves, equipment, fittings, all piping works and other facilities and all associated mechanical, civil (including Pavement and supports etc.), Architectural and structural works, Electrical & instrumentation works, telecom works (OFC Duct), Fire protection system works, Corrosion monitoring works, Cathodic protection works etc.

- Entire works at Dispatch Station located at BCPL Lepetkata including installation of scrapper trap, insulating joints, flow tee, all valves, equipment, fittings, all piping works and other facilities and all associated mechanical, civil (including pavement and supports etc.), porta cabin, architectural works, structural works (fencing etc.), Electrical & instrumentation works, telecom works (OFC Duct), Fire Protection system works, Corrosion monitoring works, Cathodic protection works etc.

- Entire works at Receiving Station cum Injection Point at SV-03 of Duliajan Feeder Mainline including installation of scrapper trap, insulating joints, flow tee, metering skid, all valves, equipment, fittings, all piping works and other facilities and all associated mechanical, civil (including building works, Brick boundary wall, Guard room, Pavement and supports etc.), Architectural and structural works, Electrical & instrumentation works, telecom works (OFC Duct), Fire protection system works, Corrosion monitoring works, Cathodic protection works etc. The SV-03 of mainline and Receiving terminal shall be collocated in the same plot.

- Hot tapping and double-double stoppling work with or without by-pass as per instruction of EIC for hook-up of 24”NB pipeline with existing underground 24”NB GNPL pipeline.

- **Dumpyard management for line pipes shall be paid as per respective SOR item after completion of paid period of respective line pipe/ coating**

suppliers for dumpyard maintenance. This shall be paid separately for each dumpyard location. However, this shall be payable only till completion of 100% panchnama of ROU or 100% mainline welding, whichever is earlier. Further, after completion of 100% panchnama of ROU or 100% mainline welding (whichever is earlier)**,** the Contractor shall take delivery of all the coated/ bare pipes from the respective stockyard locations/ dumpsites within specified time failing which penal charge of Rs. 10,500/- per day (excluding GST) per dumpsite shall be levied on the Contractor. The details of time period will be specified by Engineer-in-charge depending upon the completion of 6(1) for fresh ROU & 6(4) gazette notification for existing ROU and authorized extended period of the activity, i.e., the delay not attributable to the contractor.

- The scope of present tender includes all river crossing by HDD.
- Installation of Pipeline at crossings of road, utilities, underground pipelines and water crossings (river, canal and nala) as required.
- Installation of Pipeline by HDD method as required.
- All works related to hydro-testing, dewatering, swabbing and tie-in with adjoining pipeline/ terminal piping sections including tie-in with the HDD sections, if any.
- Carrying out magnetic cleaning & EGP.
- Pre-commissioning of the pipeline section and associated facilities.
- Commissioning assistance (as applicable) and Commissioning.
- Idle time preservation of pipeline, if required.
- All works related to HDPE duct laying and optical fibre cable (OFC) blowing.

2.2 Construction Fronts

The contractor shall be required to mobilize equipment as per number of construction fronts required for successful completion of work as per completion schedule or as per instruction of EIC is to be mobilized by contractor for the entire pipeline length of Pipeline. Tentatively, three no. construction fronts are envisaged. However, no. of construction fronts may increase/ decrease as per front availability.

Fully equipped **(as per Annexure-9B to SCC)**, maintained and functional fronts (team of equipment, manpower & Resources) are required to be mobilized by the Contractor to complete installation of facilities covered under each part as a minimum. All the construction fronts shall work simultaneously. In addition, contractor shall deploy separate crews for rail, road, water crossings and restricted areas. Contractor shall also mobilize separate teams for mechanical works at Despatch Terminal, Intermediate Pigging Station, Receiving Terminal, Tap-off point & SV Stations.

2.3 Successful Bidder is required to submit detailed methodology for working in rainy season before start of the work.

2.4 Contractor shall adopt suitable method of construction/ execution of work for restricted ROU/ Common ROU and deploy adequate equipment & manpower etc. as required. CONTRACTOR shall provide complete details of manpower, equipment etc. to be deployed.

2.5 For execution of the pipeline work in the narrow ROU space in forest areas, the CONTRACTOR shall consider the special requirements/ measures and shall deploy adequate amount of manpower and equipment for performing the work.

2.6 Mechanical, civil, architecture, structural, cathodic protection, electrical, instrumentation, telecom works, Corrosion Monitoring Systems and fire protection works for the respective pipeline shall be carried out as per relevant particular job specification provided elsewhere in the Bid document.

3.0 SCOPE OF WORK

The Contractor's Scope of work for the pipeline shall consist of, but shall not be limited to, supply (as required), fabrication, installation, testing, swabbing, drying, EGP, pre-commissioning and commissioning of the proposed pipeline system including terminal piping works and hook-up works at terminals along with all associated mechanical, civil, architectural, structural, corrosion monitoring system, electrical, instrumentation, telecom, fire protection works, Pipeline Information Management System works etc. All such works that are not indicated here below but are otherwise required to complete the work in all respects shall form part of Contractor's Scope of Work.

The scope indicated below shall be read in conjunction with Schedule of Rates as applicable, drawings, standards, specifications and other documents forming part of the Contract document.

The detailed scope of work pertaining to cross country pipeline shall be in general but not limited to the following:

3.1 Main pipeline

3.1.1 "Receiving and Taking-over" of COMPANY supplied externally/ Internally corrosion-coated and bare line pipes of all thicknesses at Company’s designated storage yard in presence of Company’s representative. Transportation including loading (except for cases, where loading of bare/coated line pipe is arranged by owner), unloading, handling, stacking, hauling and stringing of pipes from Company’s storage yards to Contractor’s worksite(s)/ workshop(s)/ pipeline Right-Of-Use (ROU), including arranging all pipe trailers, cranes, arranging all necessary intermediate storage area(s) required thereof till the complete pipeline system is permanently installed.

COMPANY shall set up storage yards for coated and bare line pipes near pipeline ROU as defined subsequently in this document. The exact location of Company’s storage yards shall be intimated to the CONTRACTOR at the time of award. In addition, COMPANY shall set up stores for all items other than line pipes as defined in scope of supply.

3.1.2 Carrying out inspection of COMPANY supplied line pipes and pipe corrosion coating at the time of receiving and taking-over for all defects etc. in the presence of Company’s representative.

3.1.3 Carrying out repairs (including supply of all materials) of line pipe and pipe coating not attributable to COMPANY which will include repair of all defects/ damages occurring during transportation and/ or handling after receiving and taking over.

3.1.4 For pipes, where cutting out involves more than 25mm from pipe ends, ultrasonic inspection shall be carried out at pipe ends for line pipe and including supply of all equipment. Contractor shall take prior approval from Company for the agency engaged for carrying out ultrasonic inspection.

3.1.5 Loading, unloading, handling, stacking, storing and transportation to workshop/ work site of all materials that may be used for the construction of pipeline system either supplied by COMPANY at their designated storage yard/ store and/ or by CONTRACTOR as the case may be. All Company supplied materials (other than line pipe) shall be issued to Contractor from Company's designated store.

3.1.6 Preparation of bevel end and coating edge of line pipes for welding.

3.1.7 Contractor shall incorporate the crossing details in the as-built alignment sheet after completion of work.

3.1.8 Carrying out all additional topographic and/ or geotechnical survey as required for local detours, detours at crossing locations during execution.

3.1.9 Geo-technical investigation and hydrological survey of all major water body crossings and other major crossings to the extent available are attached in the tender. However, contractor shall verify the authenticity of the data so provided and may conduct Geotechnical Survey if necessary, without any additional cost to the COMPANY. Further, for crossings not listed in App.-VIII, PJS and requiring to be executed by HDD/ crossings listed in App. -VIII, PJS and requiring change in methodology to HDD, contractor has to carryout geotech investigation (at least 3 no. for rivers (1 on either side of river and 1 in the waterway) and 2 no. for other crossings) as per technical specification for geotech survey as per tender document at no additional cost to the COMPANY. Also, geo-technical & topographical survey for all plots of stations/ terminals are being carried out by the COMPANY and shall be shared during execution of the contract.

3.1.10 Carrying out thorough internal cleaning of all pipes to remove debris, shots, grits etc. to the satisfaction of Engineer-in-charge.

3.1.11 Mobilizing and providing all equipments, manpower (skilled and unskilled), consumables and other resources etc., as required for the execution of complete work and thereafter demobilizing the same upon completion of work.

3.1.12 Obtaining all necessary approvals and work permits from concerned authorities having jurisdiction, as applicable for performing the work including shifting/ relocation and restoration of telephone/ electrical poles and underground pipes and other utilities etc., as required by local authorities and as directed by COMPANY. Contractor shall also obtain all necessary approvals and work permits from concerned authorities having jurisdiction for crossing underground utilities/ pipelines wherever encountered along the pipeline route.

3.1.13 Cutting/ uprooting of trees within ROU, counting the number and type of trees to be cut (before cutting) during pipeline laying works in presence of DFO/ concerned authorities keeping record thereof and handing over the cut trees as directed by

concerned authorities/ COMPANY.

3.1.13A The Pipeline corridor shall be kept as narrow as possible at all times. The pipeline shall be fully buried. Wherever possible vegetation along the centre line of the pipe shall be uprooted carefully, with soil and roots intact, so that it can be used in the reinstatement. During the excavation of the pipeline, trench top soil and subsoil material shall be kept separate and backfilled in the same order where possible imported backfill material shall be avoided and a selective backfill method used. The Trench shall be opened and closed as quickly as possible. Safe exit routes/ramps from the trench shall be provided for wildlife if a trench is left open overnight. The Pipeline shall not alter the drainage characteristic of the land. Clay Stopper bungs will be used as required.

3.1.14 Staking, clearing, grading of Right of Use (ROU). Trenching to all depths in all types of soils including soft and hard rock, including blasting, controlled blasting, chiseling, or otherwise cutting etc. to a width to also accommodate the OFC/ cable conduit as per relevant standards, drawings, specifications etc., stringing, aligning, bending, welding, NDT by Computed radiography, field weld joint coating including supply of all materials, protective coating of long radius bends and buried fittings/ valves including supply of materials, providing sand/ soft soil padding, rock shield in the trench wherever required including supply of sand/ soft soil, laying of the pipeline including locating existing pipeline using pipe locator, wherever applicable and maintaining the specified minimum spacing from existing pipeline(s), back filling including supply of select backfill material where required, carrying out rail, road, river, canal, drain, utility and submerged minor and major water course crossings including installation of carrier pipe inside casing pipe at cased crossings (wherever required), providing two component epoxy coating on inner surface of casing pipe wherever required by statutory authority, bank stabilization of water course crossings as required, arranging all additional temporary land/ area required for construction purposes. Supply and installation of anti-buoyancy measures viz. continuous concrete coating, geo-textile gravel filled bags, extra cover, select backfill etc. on pipeline, installation of supports wherever required, tie-in/ hook-up with pipeline/ piping installed by others including cutting of temporary test headers, if any, re-beveling, NDT, fit-up, welding, radiography etc.; clean-up, ROU restoration, pigging, flushing, gauging, hydrostatic testing with the quantity of corrosion inhibitor as required, dewatering with the addition of approved chemicals to neutralize the effect of inhibitor added during hydro test at required dosage, swabbing, drying, pre-commissioning and commissioning of pipeline including supply of all materials such as required type and quantity of pigs, manpower, equipment, consumables and carrying out all associated works as per relevant specifications, standards and approved drawings enclosed with the Contract document. **DGPS to mandatorily be utilized by Contractor at the time of lowering for accurate recording of weld-joint location.**

3.1.14A Owner's scope shall be restricted to publishing of 3(1), 6(1) & 6(4) Gazette notification under P&MP act 1962 for acquiring ROU free of any encroachments/ temporary/permanent structures. Assistance in Liasioning during ROU opening/Laying and getting permission from the statutory authorities shall be included by Contractor in the rates quoted for Pipeline Laying & Installation works under relevant SOR item.

3.1.15 All welding and NDT shall be carried out as per welding specification and as per welding specification charts enclosed in the bid document.

3.1.16 Welding Techniques & NDT:

Sl. No.	Description	Welding Technique	NDT
1	24" x 9.53/ 11.13/ 12.7/ 15.88/ 17.48 mm, API 5L Gr. X-70	Manual, Semi-Automatic	X-Ray by Computed Radiography

Notes:

For 24" - Mainline: 24" Main Pipeline welding may be carried out by Manual and Semi-Automatic welding process and NDT shall be carried out by Computed Radiography (CR).

3.1.17 Welding of all tie-in joints including tie-in joints and bends on either side of major river/ canal/ road/ rail crossings/ other facilities as required including adjoining pipeline spreads, cutting of test header, re-beveling and tie-in with adjacent pipeline segments.

3.1.18 Carrying out welding including cutting, edge preparation (inclusive of grinding the edges of pipe, fittings, flanges, etc. to match with the matching edges of different thickness wherever required), fit-up, bending, pre heating wherever required, NDT including radiography and other non-destructive tests as specified. NDT requirements for process and other piping shall be in accordance with relevant specifications enclosed with the Bid document.

3.1.19 Field weld joints coating and corrosion coating of Long Radius (LR) bends and pup pieces of sectionalizing valves by Heat Shrink Sleeve. 100% solid high build epoxy (minimum 600-micron thk.) shall be applied for underground piping & valves.

3.1.20 Installation of all in-line insulating joints, valves, appurtenances, online instruments etc.

3.1.21 Providing slope breakers in steep slope areas including supply of all materials, wherever required. Contractor shall carry out slope breaker survey and slope breaker shall be installed (before backfilling) as per standard after approval of Engineer-In-charge.

3.1.22 Sand/soft soil padding of minimum 200 mm thickness around pipe wherever required in areas where trenching has been done in rock or gravel or hard soil including supply of sand/ soft soil. The pipeline trench shall not be filled with gravel and large stones or boulders. Supply and installation of rock-shield in addition to 200 mm of sand/soft soil padding around the pipe in rocky areas. The rock shield shall be of minimum 6 mm thick polyethylene mat as per COMPANY specifications. Contractor shall furnish all details of proposed rock shield to be used, for COMPANY's approval.

3.1.23 Providing engineered select backfill consisting of loosely compacted cohesion less soil like sand (for the areas prone to seismic activity) including supply of cohesion less soil like sand for a distance of 1 km on either side, as per job standards. The pipeline shall be surrounded by at least 0.6 m of select backfill. Extra digging of trench shall be carried out to comply with above requirement.

3.1.24 The list of crossings indicating crossing methodology is enclosed as APPENDIX VIII to PJS. Listed crossings methodology as per APPENDIX-VIII shall be followed until there is no change in execution methodology. Moreover, for the crossings beyond APPENDIX –VIII shall be jointly deliberated and recorded for further payment through adopted methodology by respective SOR item.

However mentioned crossing methodology for respective crossing may vary depending upon site conditions during time of execution. In case of such situation, IGGL/ PMC has reserve right to inform contractor about revised crossing methodology to be adopted. The payment will be regulated based on the actual crossing methodology executed as per approved crossing methodology.

3.1.25 Carrying out National highway /State Highway, Expressway, Railway and major road crossings by HDD/ Boring method (Refer **Appendix–VIII**- List of Crossings indicating Proposed Methodology).

3.1.26 Installation of 168 mm (6" NB) CS conduit for OFC cable/ HDPE for all crossings with HDPE sub ducted in CS conduit (with proper end-sealing and arrangement of wire/etc. for pulling OFC).

3.1.27 Supply and Installation of warning mat over entire pipeline as per relevant specification. Warning mat shall be at a depth of 500 mm below the natural ground level on the pipeline partial backfilling.

3.1.28 Providing all necessary barricading material, safety signboards, warning lights etc to safeguard the pipeline against accidents during construction of line in city area.

3.1.29 Localized purging/ inertisation including supply of nitrogen during hook up with existing Pipeline/ piping at existing terminal, if any.

3.1.30 Loading, unloading, handing over and transportation of all surplus COMPANY supplied free issue materials including line pipe to COMPANY designated stores and stacking of the same. Stacking of surplus pipe & other material shall be inclusive of supplying of sand bags etc.

3.1.31 Transportation of long radius bends for installation in terminals/ other areas / work site(s), return of surplus material/ bends etc. to storage yard/ work site/ Company's store shall be in Contractor's scope. LR bends shall be installed only at the locations shown in alignment sheets, approach drawings and locations approved by EIC.

3.1.32 Carrying out cleaning, flushing, swabbing, dewatering, testing and pre-commissioning of pipeline and associated facilities at Dispatch Station, Sectionalizing Valve Stations, Future Tap-Off point & Receiving Station. Locating all major and minor leaks during hydro-testing, if any.

3.1.33 Repair of leaks/ burst, not attributable to Contractor, occurring in Company supplied material, shall be carried out by the contractor and the Contractor shall be compensated as per provisions of the contract. However, Contractor shall carry out repair of defects attributable to Contractor at no extra cost to Company. Contractor shall submit a report for failure to Company.

3.1.34 Carrying out Magnetic cleaning (pigging with the help of magnetic pig to remove steel debris), Electronic Geometric Pigging (caliper pigging) for the pipeline section including supply of all types of pigs, pig locating and tracking device, spares, consumables, manpower etc. as per specification enclosed with bid/ contract document.

3.1.35 Carrying out repair of all defects found during electronic geometric pigging including locating, digging, cutting, welding, NDT etc.

3.1.36 Commissioning of pipeline & associated facilities providing all equipments, manpower, machinery, consumables including required number of pigs and assistance as required during commissioning of pipeline system and associated facilities viz. Dispatch Terminal, Sectionalizing Valve Stations, Future Tap-Off point and Receiving Terminal.

3.1.37 **Pipeline Information Management System is to be implemented by laying Contractor** as per the scope detailed in particular job specification enclosed as **Annexure-VIII** and SOR enclosed elsewhere with the tender. As a minimum the documents to be uploaded in PIMS system shall include but not be limited to the following:

- Daily and Monthly Progress Report
- All approved working procedures
- Approved Welding Procedure Specification (WPS) / Procedure Qualification Record (PQR).
- Approved Alignment Sheets / Crossing Sheets
- HSE Reports
- Material Reconciliation Report
- Status report of contractor bought out items including relevant documents (QAP, TC, etc.)
- Data for Preparation of Pipe Book
- Technical documents of bought out items (MDS, QAP, QA, Inspection Report, etc.)
- All As-Built Documents

3.1.38 Final clean-up and restoration of ROU and other conveniences like temporary approach roads/ temporary works, barren land, road, rail, canals, water crossings, cultivable land etc. to original condition as per specification and drawings to the entire satisfaction of COMPANY and/ or authorities having jurisdiction over the same, including disposal of surplus construction materials to Company's designated stock yard(s) or as directed by Engineer-in-charge. CONTRACTOR shall restore stones laid to mark the boundaries of adjoining fields to original conditions. Contractor shall arrange necessary clearance from all concerned authorities/ land owners to the effect that ROU has been restored back to the original condition.

3.1.39 Disposal of surplus excavated soil from trench outside ROU.

3.1.40 Idle time preservation by filling Nitrogen at a positive pressure of 2 bar (g) as per specification, if required including supply of Nitrogen.

3.1.41 Preparation of as-built drawings, pipe-books, documents, photographs and project records as per specification and instructions of the COMPANY including furnishing of all Test Certificates/ Inspection Reports for all materials used for permanent installation. Taking over Crossing details from HDD agency (in case of separate

agency) and compilation of all as-built drawings, project records, pipe book etc. shall be in laying contractor's scope of work.

3.1.42 Taking over surplus bare and coated pipe from coating contractor at storage yard after completion of work, loading, unloading, transportation and handing over of all surplus Company supplied free issue material including short length of pipes to Company's designated Storage yard as directed by Engineer-in-charge.

3.1.43 In case any activity though not specifically covered in schedule of rates description but same is covered under scope of work/ Specification / drawings, it is understood that the contractor shall do such performance & provisions so mentioned without any time & cost implication.

3.1.44 Any other works not specifically listed herein but are required to be carried out to complete entire work related to pipelines and the associated facilities.

3.1.45 Installation of casing pipes (by open cut/ jacking/ boring/ any other trenchless technique) assembly, including supply of all materials, casing insulators and end seals, vents and drains etc. complete, at cased crossings.

3.1.46 Supply of HDPE ducts for laying of OFC.

3.1.47 Supply of inter-linkable mud mats.

3.1.48 Providing loosely compacted cohesionless soil like sand, murrum, silty sand for specified distance in seismic prone areas.

3.1.49 Crossings of rivers/streams/canals by Open Cut:

a) Pre-construction surveys, preparation of detailed construction method statement and calculations for Company's approval.

b) Geo-technical investigations, if required.

c) Site preparation, arranging required land for setting up of string fabrication yard and obtaining necessary permissions from concerned authorities.

d) Preparation of pipeline Launch way, continuous concrete coating of pipes, repair of damages to corrosion and concrete coating, string preparation, field welding, NDT including radiography, pretest of completed strings, corrosion and concrete coating of field joints, trenching, laying at approved depth, backfilling including supply of select backfill material (where required), stabilization of banks, post installation hydro test, capping, providing and installing of markers, etc.

e) Installation of HDPE conduit, laying of OFC inside the conduit. Contractor shall install pipeline and OFC conduit together in river crossings and HDPE conduit shall be strapped using corrosion resistance straps to the main pipeline in the top quadrant. Stability of the combined installation shall be ensured.

3.1.50 HDD works shall be carried out in accordance with specification enclosed with bid

package. For directionally drilled crossing, following shall be performed:

a) Carrying out all surveys and collection of data, as may be required for the design and construction of the crossings.

b) Carrying out all engineering, design calculations and preparing all construction drawings for laying of pipeline and optical fibre cable inside steel pipe as per requirements for installation of river crossings by HDD method.

c) All construction activities required for installation of the crossings viz. site preparation, preparation of pipe string, repair of damages to corrosion coating, field welding, NDT including radiography, pretest of completed string, corrosion coating of field joints, holiday testing of complete pipe string, drilling in all types of soil including gravel, boulders and disintegrated and hard rock, installation of pipeline, post installation hydro-testing of the crossing section, capping, providing and installing markers at crossings.

d) Field joint coating shall be carried out using Fibre glass reinforced heat shrink sleeves suitable for HDD crossings.

e) Supply of duct of flexible HDPE/ plastic corrugated tubing for laying of OFC cable, preparation of steel conduit string and corrosion coating of weld joints.

f) Installation of pipeline and 6" NB steel conduit for OFC (together in a single drilled hole or separately in two independent drilled holes).

g) Tie-in with main pipeline after successful installation of pipeline at river crossing.

h) Testing and jointing of OFC at either ends with OFC in main pipeline trench.

i) Contractor shall dispose bentonite slurry safely as per technical specification and environmental requirements as applicable.

3.1.51 After the HDD string has been pulled, following tests need to be performed:

a. <u>Visual Inspection</u>

HDD Pipe string at the point of exit, shall be visually inspected for any coating damages by exposing minimum one pipe length and one joint coating. The exposed pipeline section will be video-graphed and photographed for submission to MECON for review and records along with RA bill.
After the visual examination, entire 12-meter length and one joint will be subjected to holiday test at 25KV using a full encirclement detector. It will be ensured that there will be sufficient clearance between the pipe and the soil so that there are no false alarms due to electrode touching soil.
Coating inspection of the pipeline after completion of pulling operation shall be made by:
a) Pulling the pipe to the extent possible with normal rig set up at the exit point.

b) Excavating the adjacent portion up to and including the first field joint at the exit point.

The pipeline and joint coating shall be examined visually and with holiday detectors for defect. The length to be inspected shall, as a minimum, be one pipe length and one joint coating. In case damages/ holidays are detected in the first pipe length/ joint, the subsequent pipe length/ joint shall be exposed, and coating integrity checks shall be made. If found acceptable by Company, the first pipe length/ joint shall be repaired and/or replaced as directed by Company. If the coating of second pipe length/ joint is also found damaged, Contractor shall propose further course of action and Company's instructions shall be followed. All works shall be done at no extra cost to Company. If the pipeline fails in Holiday test, the type of coating damage – gouge damage all along the length or isolated damages shall be recorded. In case of significant gouge damage to coating all along the length of pipe, the contractor may be asked to carry out remedial actions including but not limited to repair of coating or executing HDD again (or as deemed suitable) etc. at no extra cost to company.
No coating repairs shall be carried out till the time IGGL/ MECON after examining the coating damages do not give a go ahead to proceed further.

b. <u>CIT Test</u>
Contractor has to carry out CIT survey as per procedure (defined elsewhere in the tender) after HDD pulling has been completed. For acceptance of CIT survey, refer CP Design basis (Doc no. MEC/E-0085/05/E9/02/CP/001, R-1, Pg 9/23) Clause no. 7.1 (Sr.no. S of Table-2) for "Acceptable Coating current". In case CIT survey after pulling fails, HDD shall not be acceptable and the contractor shall be liable for carrying out new HDD for the crossing at his own risk & cost. Also, payment shall be made only for the successful HDD (i.e., results of hydrotest, EGP and CIT are satisfactory as per technical specification).

3.1.52 Based on the soil strata, if contractor feels requirement of any additional protective coating (such as Abrasion Resistant Overlay (ARO) etc.) over and above 3LPE coated pipe/ joint coating for successful pulling / execution of HDD, the same shall be supplied and installed by the contractor after due approval by EIC without any additional cost to company. The contractors shall propose vendors of the ARO system having an extensive proven and successful track record in India or globally on 3LPE coated pipeline in a rocky HDD environment for ARO applied on the entire HDD string. This needs to be substantiated by Coating Integrity Test (CIT) reports after completion of the HDD.

3.1.53 Clean-up and restoration of ROU and other conveniences like road, rail, canals, cultivable land, water facilities, irrigation facilities, boundary wall/fence etc. to original condition as per specification and drawings to the entire satisfaction of Company and/or Authorities having jurisdiction over the same, including disposal of surplus excavated soil and other construction materials to a location identified by Contractor approved by local authority without causing any disturbance to environment and to the entire satisfaction of Company.

Contractor shall arrange necessary clearance from the concerned authorities/ land owners to the effect that ROU/ ROW has been restored back to original condition. Contractor shall carry out joint survey with representative of Competent Authority (CA)

and will obtain clearance in writing from CA that ROU has been restored to original condition. Necessary clearance from statutory authority / NOC for restoring the ROU to original condition shall be in Contractor's scope. Necessary proof of restoration i.e., through photographs and video recordings will have to be submitted by the contractor where ever NOC is not available.

3.1.54 Carrying out corrosion coating of long radius bends by heat shrink sleeve as per specification enclosed with tender document.

3.1.55 Tie-in with the pipeline at rail, road, river and other crossings including cutting of test headers as required and tie-in with terminal piping & with existing facilities as applicable.

3.1.56 At all pipeline tie–in locations, the trench shall be excavated further wherever possible and permanently lubricated HDPE duct shall be laid away (approx. 1 meter) from the pipeline to avoid damage to the HDPE conduit and to the pipeline.

3.1.57 Preparation of video films with audio commentary covering all aspects of pipeline construction annotated as required, conversion of the same to video hard drive and USB format, submitting three (3) sets of the same.

3.1.58 Carrying out subsurface utility survey along the ROU/ROW or proposed pipeline route and/ or as specified by Engineer-In-Charge for provided ROU/ROW/Corridor (Min. 5 meter) using Ground Penetrating Radar (GPR) for depth up to 5m below the existing ground level to locate and identify all existing underground utilities/buried objects including but not limited to pipelines, sewers, conduits, cables, drains, manholes, appurtenances etc. in the proposed corridor along with location, DGPS coordinates,

3.1.59 Jib Crane load Testing wherever applicable as per relevant IS Code.

3.1.60 Complete scope of Hot tapping and double-double stoppling work for hook-up and taking 24" NB tapping from existing 24" NB GNPL Pipeline at existing SV-14 located in Jorhat. The scope shall include preparing basic scheme, obtaining all permissions/ clearances/ permits from Owner/ concerned authorities, carrying out simulations for in-service welding and submitting for review of MECON/ IGGL, obtaining approval from MECON/ IGGL for work procedures, QAPs, GA drawings, datasheets, WPS, etc., Preparing Risk assessment, risk mitigation plan, contingency plan, disaster management plan, etc., location of pipeline using pipe locator, excavation, removal of 3LPE coating from existing live underground 24" NB pipeline, checking thickness using ultrasonic meter, checking for any abnormalities, supply, placement and welding of split tee(s) on 24"NB pipeline for 24"NB tapping (as per P&ID), NDT (MPT, DPT, X-ray, UT) of welded joints, testing prior to hot tapping, Supply & installation of cutter housing, temporary sandwich valve/ full bore valve, bleed valves, vents, pipe, 3-way spool piece, LOR plugs, LOR+ plugs, TOR, flanges, blind flanges, assorted pipes, temporary sandwich valve/ full bore valve, bleed valves, vents, pipes, drains, elbows, gas bags etc. (as required), mobilizing hot tapping machine & stoppling machine with all accessories, cutting tool, stoppler etc. for hot tapping & stoppling works, Assembly of Stopple Machine with Stopple on LOR fitting, Retrieval of stopple plugs using hydraulic cylinder and power drive unit, Installation of LOR/ LOR plus plugs in the stopple housing, Welding of cut

coupon on scarfed nipple of LOR/ LOR plus plugs, Fixing of Lock-O-Ring plugs in split tee LOR/ LOR plus flanges through sandwich valves, Carrying out coupon cutting, carrying out double-double hot tapping & stoppling operation as per API 2201 & tender requirements with or without by-pass as per instructions of EIC, fabrication, NDT and installation of by-pass line if directed by EIC, cold cutting of line, installation of 24"x24"x24" flow tee in GNPL mainline for hook-up, taking branch line of 24"NB from newly installed flow tee, Safely removing machine & temporary fittings such as sandwich valves, Blinding of LOR/ LOR plus plugs, coating of all buried valves, flanges, fittings, nuts, bolts suitably with heat shrink sleeve/ high build coal tar epoxy of min 2 coats of 600 micron (total DFT) and boxing up, clearing the area, backfilling, restoration, demobilization and preparation of as-built documents. The scope shall include arranging tractor with trolley, water tanker, dewatering pump, grinding and cutting machine, hydra, crane, excavator, d-shackle, slings, welding machines, UT machine, Power and Area lighting including arranging DG sets, diesel, fabricated structures including double handling, tents, ladders, temporary platforms, scaffolding, barricades, etc.

3.1.61 All incidental and associated works and any other works not specifically listed herein but are required to be carried out to complete entire work related to pipelines and the associated facilities and making the entire pipeline system ready for operation.

3.1.62 The Contractor shall, at its own cost and responsibility, carry out all necessary liaison with Central/ State Government authorities, local bodies, statutory authorities, utility agencies, and other local organizations as required for execution of the project. No separate payment shall be made for such liaising activities, and the quoted rates shall be deemed to include all costs associated therewith. However, statutory fees payable to Government departments, wherever specifically reimbursable under the Contract, shall be borne/ reimbursed by the Owner as per the Contract provisions.

3.1.63 Liasoning before pre-construction survey, opening of ROU and up to completion of entire Mainline works (including CP and Telecom works); all type of liasoning & coordination with local people / Farmers / authorities for ensuring hindrance-free construction works at site; obtaining NOC from respective land owner / farmers as and when required; submitting request for authority permission (after obtaining the letter from client), follow-up, assisting in site inspections/ route survey/ site report & drawing preparation and submitting to owner for approval, re-submission after incorporating comments (if any), modification if required. Liaison with any statutory authorities i.e., NHAI, PWD, Railways, Irrigation, Forest, Municipal Corporation etc. Obtaining work permits /NOC from various statutory authorities having jurisdiction for execution of the work and complying with all stipulations/ conditions/ recommendations of the said authorities.

3.1.64 Pre-construction survey using pipeline locator as well as dig site verification by trial pits as directed by EIC for identification of existing pipelines. Any compensation required for dig site verification shall be payable by the Contractor. Benchmarks being established by the survey agency shall be provided to the contractor, however, post route survey the contractor at its own cost shall establish and maintain (up to completion of lowering) additional benchmarks, if required, in order to facilitate the recording of accurate coordinate and level data of each weld-joint post lowering.

3.1.65 Assistance in Panchanama including but not limited to RoU survey & marking, damage assessment, identification panchnama, document collection, Latkajari etc. which are required to finalize Award by the Competent Authority, Assam).

The scope of Panchnama and ROU management shall include but not limited to:

a. Identify, intimate, liaison and mobilize land owners, Sarpanch/ Talati or any local administrative officer accepted by CA for punchnama.
b. Provide manpower for survey, establishing the ROU corridor based of TP/ IP provided, peg, choona marking of ROU.
c. Liaison and mobilize land owners for receiving all types of compensation including land compensation cheques from CA's representative.

3.2 Associated Works for Pipeline Construction

3.2.1 Installation of casing pipes (by open cut/ jacking/ boring) assembly, including transportation of casing pipe from company store and supply of all materials, viz. casing insulators and end seals, vents and drains etc. complete, at cased crossings. In case, coated casing pipe is supplied as free issue material, then the contractor shall remove coating before installation.

3.2.2 Cased crossings shall be installed at locations as per instructions of Engineer in-charge. The number of crossings indicated in alignment sheets is subject to change based on engineering, construction and statutory requirements or the requirements of the authority having jurisdiction over a utility crossing.

3.2.3 Supply and installation of all types of pipeline markers including their painting suitable for ***highly corrosive environment*** as per specification and all associated civil works.

3.2.4 Tie-in/ hook-up of pipeline at Despatch / Receipt Terminal / SV /Future tap-off Stations and existing facilities, is in the scope of Contractor.

3.3 Piping Works at Despatch Terminal, Receiving Terminal, Intermediate Pigging Station (IP), Sectionalizing Valve Stations and Future tap-off.

Facilities to be installed at various terminals (Despatch & Receiving), Intermediate Pigging Station, Sectionalizing Valve (SV) Stations, Future Tap-off, as a part of overall pipeline system are shown in respective Piping & Instrumentation diagrams (P&IDs) enclosed.

a. <u>Dispatch & Receiving Terminals / SV Stations</u>

Preliminary equipment layouts/ Plot plans & P&ID for the terminals/ stations are enclosed with this Bid. These drawings are indicative only and are enclosed to enable the Contractor to understand the nature of work involved. Issued for Construction (IFC) piping General Arrangement Drawings (GADs) shall be progressively furnished to the Contractor, at an appropriate time at project execution stage.

Contractor shall carry out all works strictly in accordance with the Issued for Construction (IFC) drawings and reference specifications/ standards, documents, data sheets etc. enclosed with this Bid document and instructions of Company/ Engineer-in-Charge and other provisions of Bid document.

The Contractor's Scope of Work for the work tendered shall consist of, but not limited to, supply (as indicated in Scope of Supply), installation, testing, pre- commissioning and commissioning of terminal piping complete, with all associated mechanical, civil, architectural, structural, corrosion monitoring system, electrical, instrumentation, telecom, firefighting, etc. as applicable including all such works which though specifically not indicated here but will otherwise be required to complete the work in all respects.

The scope indicated below shall be read in conjunction with Schedule of Rates as applicable, drawings, standards, specifications and other documents forming part of the Contract document.

3.3.1 "Receiving and Taking over" as defined in specifications of all Company supplied materials including equipment from the Company's designated place(s) of issue defined elsewhere, transportation including loading, unloading, handling from Company's designated place(s) of issue to Contractor's own stock yard(s)/ work site(s)/ workshop(s), including arranging all necessary intermediate storage area(s) thereof till the materials are installed in permanent installation.

3.3.2 Procurement and supply of all materials, equipments that are included in the scope of supply of Contractor, transportation of all materials from manufacturer's works including loading, unloading, handling, storing and transportation to work site(s)/work shop(s) including arranging all necessary intermediate storage area(s) thereof, as required.

3.3.3 Fabrication, erection, testing of all above-ground/ buried piping system including installation of metering skid, scrapper trap etc. consisting of pipes, valves (manual and actuated), flanges, fittings, flow tees, pig signalers, insulating joint etc.; carrying out all applicable works associated with buried pipeline within the Terminals/ SV station / Future Tap-off point / boundary wall/ fence (wherever applicable), some dismantling works in existing stations (as applicable), carrying out welding, NDT including Computed radiography; weld repairs/ retesting, cleaning/ flushing hydro testing, dewatering, functional testing, cutting of mainline and beveling (if required), excavation in all types of soil for installation of piping and pipe supports, pre-commissioning, providing commissioning assistance (wherever required) and commissioning including supply of all materials and manpower that are required during pre-commissioning and commissioning and all associated works.

3.3.4 Installation of Sectionalizing Valve stations in all terrains/ soils including all above ground/ underground piping at all elevations and depths including all civil works, viz. filling and compaction of valve station areas, excavation of pits, gravel filling, construction of supports, foundations, construction of access road to installation from nearest metalled road, installation of all valves and valve actuators and all fittings/ piping works.

3.3.5 Preparation of isometrics and/or fabrication drawings required for the purpose of fabrication during execution of work.

3.3.6 Obtaining all necessary approvals and work permits from concerned local authorities having jurisdiction including hot work permit as applicable for performing the work in

existing terminal facilities. Arranging of adequate fire-fighting equipment viz. fire brigade, fire extinguisher, shielding from existing facilities, oxygen mask etc. for carrying out the work safely to the satisfaction of COMPANY.

3.3.7 Carrying out welding including cutting, edge preparation (inclusive of grinding the edges of pipe, fittings, flanges, etc. to match with the matching edges of different thickness wherever required), fit-up, bending, pre heating wherever required, NDT including Computed radiography and other non-destructive tests specified. NDT requirements for process and other piping shall be in accordance with relevant specifications enclosed with the Contract document.

3.3.8 Installation of all types of valves (manual/ actuated), all types of inline/ online instruments such as PSVs (other than those covered separately), safety valves, tapping for thermowells, sample connections, pressure gauges, corrosion monitoring system etc. for all sizes and ratings including fixing of gaskets, bolts, studs and nuts of all sizes, ratings and materials.

3.3.10 Installation of all in-line and on-line instruments including Skin Temperature measurement assemblies.

3.3.11 All works for corrosion monitoring system (CMS) system as described in relevant document enclosed elsewhere with Bid document.

3.3.12 All associated civil works, viz. levelling, filling and compaction of station areas as required, necessary stone pitching at the sides of earth fill (if required), excavation of pits, gravel filling, paving as required, access road to installation from nearest all weather approach road, etc.

3.3.13 All associated structural and mechanical works including supply of all materials required, unless covered separately elsewhere in the Bid document, including construction of foundations (PCC/ RCC works) for equipments and pipe supports and sleepers, fabrication and erection of supporting structural elements for piping such as shoes, clamps, anchors, guides, insert plates, brackets, structural column, valve operating platforms, pipe crossovers etc. Contractor shall provide grating as per details currently included in the tender document or as per details furnished subsequently.

3.3.14 Supply of bolts, nuts, gaskets, washers, U bolts, clamps, clips, gaskets for supports for all piping works.

3.3.15 Supply, fabrication and erection of supporting structural elements for piping such as shoes, clamps, anchors, guides, insert plates, brackets, structural column etc.

3.3.16 All associated structural, instrumentation, telecom, mechanical and civil works including supply of all material required, covered separately elsewhere in the Bid document.

3.3.17 Hook-up of piping with equipments and vessels and hook-up of all piping at the battery limit with the pipeline/ piping including cutting of temporary test header, re-beveling, NDT, fit-up, welding, radiography etc. including interface/ coordination as required with other Contractor(s)/Agencies (as applicable).

3.3.18 Painting of above ground piping (including supply of materials), structural steel elements, for pipe supports, all equipments and all related miscellaneous items as required and as directed by Engineer-in-charge. Paint shall be suitable for highly corrosive environment in accordance with specification. Wherever touch up/ repair of primer is required, high build epoxy zinc phosphate primer shall be used.

3.3.19 Protective coating of 100% solid high build epoxy minimum 600-micron thk for all underground piping, valves, fittings, etc.

3.3.20 Corrosion protection coating of all field weld joints for buried piping of all sizes including supply of all materials.

3.3.21 Cleaning by card board blasting, Hydro testing, dewatering and drying of piping system of all sizes as per specifications enclosed.

3.3.22 Final clean up and restoration of site, facilities etc. as per the requirement of COMPANY/ Engineer-in-Charge including filling (wherever required) and grading of areas around stations for avoiding any local flooding of area.

3.3.23 Transportation and stacking of all surplus COMPANY supplied free issue material to Company's designated store after completion of works or as directed by Engineer-in-Charge.

3.3.24 Preparation of as-built drawings, documents and project records as per instructions of Engineer-in-Charge.

3.3.25 Preparation of detailed procedures for fabrication, installation, testing, pre-commissioning and commissioning. Such procedures shall be submitted to COMPANY/ Engineer-in-Charge for review and approval.

3.3.26 Obtaining all statutory clearances, approvals, permissions and hot work permit for the works as required.

3.3.27 Fabrication and erection of piping supports and change of existing support/ additional supports installed by others as directed by Engineer-in charge.

3.3.28 Idle time preservation of mainline and terminal piping by nitrogen gas (including supply of nitrogen, any other consumable, temporary manifold having requisite valves, flexible hose pipe, braided pipe, suitable fittings, etc.) with positive pressure 2 bar (g) for specified period. **If the pipeline commissioning after pressure testing is anticipated to be delayed beyond six (06) months, all piping and equipment in stations (Dispatch, receiving, IP, SV, tap-off etc.) to be preserved by filling with any inert gas such as nitrogen at a positive pressure.**

3.3.29 Any other works not specifically listed herein but required for completion of the works in all respects.

3.4 All construction works shall be carried out as per "Issued for Construction" drawings, procedures, specifications and applicable codes and standards. Any changes at site shall also need prior approval from the COMPANY and revision of drawings.

3.5 **Cathodic Protection Works**

Cathodic Protection works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-I** and SOR enclosed elsewhere with the tender.

3.6 **Corrosion Monitoring System Works**

Corrosion Monitoring System works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-II** and SOR enclosed elsewhere with the tender.

3.7 **Civil, Architectural & Structural Works**

Civil, Architectural & Structural works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-III** and SOR enclosed elsewhere with the tender.

3.8 **Instrumentation Works**

Instrumentation works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-IV** and SOR enclosed elsewhere with the tender.

3.9 **Telecommunication Works**

Telecommunication works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-V** and SOR enclosed elsewhere with the tender.

3.10 **Electrical Works**

Electrical works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-VI** and SOR enclosed elsewhere with the tender.

3.11 **Fire Protection Works**

Fire Protection works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-VII** and SOR enclosed elsewhere with the tender.

3.12 **Pipeline Information Management System (PIMS)**

PIMS works shall be carried out as per the scope detailed in particular job specification enclosed as **Annexure-VIII** and SOR enclosed elsewhere with the tender.

4.0 SCOPE OF SUPPLY

4.1 Materials to be supplied by COMPANY as Free Issue

Company shall supply the following Pipeline/ Terminal piping materials required for permanent installation to the Contractor at an appropriate time during the execution stage as free issue materials:

Line Pipes:

Entire required quantity of bare/ coated line pipes of all thickness (except 24” 12.7 mm

bare pipe) shall be supplied by Company. Line pipes (bare/ coated) shall be made available to the Contractor at designated storage yards. Transportation of the line pipe from designated storage yards to work site shall be in the scope of the CONTRACTOR. Further the CONTRACTOR has to ensure safe storage.

a. Bare Line Pipes API 5L Gr. X-70 for 24" NB x 12.7/ 15.88/ 17.48 mm (as applicable) shall be used for fabrication of LR bends and aboveground piping in front of scrapper trap by the Contractor.

b. The quantities of coated and bare line pipes indicated in the bid document are approximate and may vary. The exact quantity shall be intimated to the Contractor after award of work.

c. Contractor to note that quantities of line pipe indicated in the bid document includes contingency/ extra length over and above the actual requirements. Surplus pipes shall be taken over by the Installation contractor from the coating contractor at storage yard after completion of Installation works. It is the responsibility of installation contractor to return surplus pipes to the COMPANY designated storage yard as per instructions of Engineer In-Charge after completion of installation works.

d. Receiving and taking over of bare and coated line pipes at Storage yard including its inspection. All trucks / trailers for transportation of line pipes from storage yards to site/ ROU/ Contractor's storage Yard shall be supplied by contractor. The coating contractor shall load the coated/bare line pipes onto the truck/trailers supplied by contractor.

e. Contractor shall note that the dump yard/ storage yard chainages/ locations indicated in the bid document are approximate and may vary based on the availability of land and NH/ SH/ Rail approach. The exact location of Pipe Storage Yards shall be intimated to the Contractor at the time of award. Contractor shall be responsible for performing all works as per scope of work at the finally selected storage yard location by the COMPANY at no extra time / cost to the COMPANY.

f. Contractor shall note that Chainage indicated for SVs are approximate and may vary ±10 % along the pipeline chainage, based on the availability of land and NH/ SH/ Rail approach. Some of the stations are planned in existing stations. The exact location of SV stations shall be intimated to the Contractor at the time of award. Contractor shall be responsible for performing all works as per scope of work at the finally selected SV locations by the COMPANY at no extra time/ cost to the COMPANY.

g. Transportation of pipes and other free issue material from place of issue is in Contractor's scope. Contractor shall note that the prices indicated in the Schedule of Rates shall be inclusive of taking the delivery and transportation of line pipes and other material from the above storage yard/ stockyard to work place(s).

h. Bevel Protectors of the line pipes shall be the property of the pipeline installation Contractor. He has to collect and dispose-off the bevel protectors. Contractor shall quote accordingly.

i. Void

j. The Storage yard shall be managed by coating contractor under a separate contract. The coating contractor shall load the coated/ bare line pipes onto the trailers supplied by Installation Contractor.

k. ***Laying contractor shall take over remaining qty. of bare and coated pipe from line pipe supplier(s)/coating contractor at dump site (after completion of dumpsite maintenance period of line pipe supplier/coating contractor) as per scope of work and instructions of Engineer-in Charge. Laying contractor shall also be responsible for establishing, arranging and maintaining his own line pipe dumpsite till completion of all works.***

Other Terminal Materials

Company shall supply the following materials to be installed as a part of Terminal piping as free issue:

i. Metering skids

ii. Scrubber

The Company shall make above free issue materials available at the IGGL store locations as indicated in ***Annexure-2 to SCC***.

Contractor shall arrange all trucks/ trailers, cranes etc. for transportation of above materials including loading at Company store, unloading at contractor's storage yard/ work site, arrangement of cranes, handling etc.

Contractor shall return all surplus material to company designated storage yard as decided by Engineer In- charge.

4.1.1 **Conditions for COMPANY Supplied Material**

i. The Contractor shall be responsible for taking over of the material and subsequent handling, hauling, transportation to the actual work site(s)/fabrication yard(s) and storage & safe keeping of the materials. Contractor shall arrange all equipment/ cranes etc. for loading of these materials on their truck/trailers for transportation except line pipe.

ii. The Contractor shall inspect all COMPANY supplied free issue materials at the time of taking over from the COMPANY and defects noticed, if any, shall be brought to the notice of COMPANY/ COMPANY representative and jointly recorded. Once the material has been taken over by the Contractor, all the responsibility for safe keeping of the materials shall rest with the Contractor.

iii. Every month the Contractor shall submit to the COMPANY an account for the material issued to the Contractor in the Performa prescribed by Engineer-in-Charge.

iv. On completion of the works, Contractor shall submit a "Material Appropriation Statement" for all materials supplied by the COMPANY as free issue materials.

v. The scrap allowances shall be permissible as per the provision of Bid

document. The percentage allowance shall be accounted on the basis of actual consumption as incorporated in the work.

vi. All unused and scraps material shall be the property of the COMPANY and shall be returned by Contractor to COMPANY at COMPANY's designated storage point(s) including transportation of the same from Contractor's stock yard(s)/worksite(s)/work shop(s) to the COMPANY's designated storage point(s). Contractor shall be responsible for the proper measurements of the unused/ scrap materials to be returned to the COMPANY.

4.2 Materials to be supplied by CONTRACTOR

The procurement and supply, in sequence and at appropriate time and place, including inspection and expediting, of all materials and consumables required for completion of the work as defined in this bid document except the materials specifically listed under para 4.1 above as COMPANY free issue material, shall be entirely the CONTRACTOR's responsibility and the item rates quoted for the execution of the WORK shall be inclusive of supply of all these materials. All materials supplied by the CONTRACTOR shall be strictly in accordance with the requirements of relevant COMPANY material specifications enclosed with the Contract document. All equipment, materials, components etc. shall be new and specifically purchased for this job from Company approved vendors, duly inspected by third party inspection agency (shall be 3.2 certified - refer **APPENDIX-VI** – Third Party Inspection Agency) along with manufacturing certificate for relevant pressure containing equipment/ materials/ parts/ components etc. For other contractor supplied equipment/ materials/ parts/ components, contractor has to submit test certificate as per technical specification/ applicable codes/ approved QAP (as applicable) before supply. As a minimum, the materials to be supplied by CONTRACTOR may include but shall not be limited to the following.

i. Valves (all sizes)

ii. Flanges & fittings (all sizes)

iii. Assorted Pipes (all sizes)

iv. Scrapper Trap

v. Flow Tee (all sizes)

vi. Insulating Joints (all sizes)

vii. CS conduit

viii. LR bends

ix. Flame arrestors

x. Mud mats

xi. Safety Relief Valves (all sizes)

xii. All equipment & consumables such as welding electrodes, oxygen, acetylene, inert gases, all types of welding electrodes, filler wires, solder wires, brazing rods, flux etc. for welding/ cutting and soldering purposes.

xiii. All materials for all types of pipeline markers including cement, sand, reinforcements, structural steel etc. and paint conforming to normal corrosive environment as per specification enclosed with the bid documents.

xiv. Casing insulators and end seals and materials for casing vents and drains as per drawings.

xv. All materials required for continuous concrete coating/ gravel filled geo-textile bags/ saddle weight for providing negative buoyancy to the pipeline wherever required. Contractor shall take prior approval of COMPANY and furnish all details including design calculations in case of use of purpose-built geo-textile bags. For river crossings, only continuous concrete coating shall be provided for negative buoyancy.

xvi. Supply of warning mat.

xvii. Supply of all materials for installation of wind-sock and safety signboard at different stations.

xviii. All materials and consumables required for external corrosion coating and concrete coating (where required) of field weld joints.

xix. All materials required for field joint coating, corrosion coating of LR bends, pup pieces of sectionalizing valves and repair of damaged corrosion coating of line pipe. Contractor shall confirm that proposed field joint coating material is suitable for type of terrain encountered along pipeline route. Contractor shall take prior approval from COMPANY for field joint coating material to be used. The cut back length shall be 150 mm + 20 (-0) mm.

xx. All material, equipment & consumables for HDD works including Fibre Glass Reinforced Heat Shrink Sleeves suitable for HDD works.

xxi. All materials required for sand/ soft soil padding around pipeline and optical fibre cable, select backfill of approved quality, slope breakers, bank stabilization of water crossings etc.

xxii. For rocky areas, rock shield shall be provided in addition to sand/ soft soil padding. Rock shield shall be of high-density extruded polyethylene mesh with following properties:

Thickness	ASTM D-1777	6 mm (minimum)
Compressive Strength	ASTM D-1621	250 PSI
Impact Resistance	ASTM G-14	100 in-lb.

Contractor shall obtain prior approval from Engineer-in-charge for rock shield material & its application procedure.

xxiii. All materials including consumables, nitrogen etc. required for hook-up with existing facilities and equipments.

xxiv. Mobilizing and providing all necessary barricading material, safety signboards, warning lights etc. to safeguard the pipeline against accidents during construction of line in city area.

xxv. All safety tools, tackles, devices, apparatus, equipment etc. including ladders and scaffolding complete as required.

xxvi. All stud bolts, nuts, jack screws, all type of gaskets (metallic spiral wound gaskets) in required quantities to be used for permanent installation into the system for all sizes and ratings of flanges and flanged valves, equipment etc., including nuts, bolts, gaskets, washers, U bolts, clamps, clips etc. for pipe/ equipment supports. All materials for supports shall be in contractor's account.

xxvii. All types of coating and painting materials including primer and paints suitable for normal corrosive environment for painting above ground piping and 100% solid high build epoxy (minimum 500-micron thk.) for underground piping/ valves, etc.

xxviii. All pipes, fittings, flanges, blind flanges, gaskets, nuts, bolts, clamps, strainers, equipment/ consumable, metallic blinds, temporary gaskets as required for filling, pressurizing, hydrostatic testing and dewatering, swabbing etc. including test headers for pigging and hydro-testing.

xxix. All materials such as cohesion less soil/ sand required for installation of pipeline in seismic active zones.

xxx. All materials, equipments, consumables etc. required for magnetic cleaning and caliper pigging of pipeline.

xxxi. All materials required for civil, structural and general civil works including structural steel, cement, reinforcement, concreting, grouting etc. in facilities like Despatch terminal, SV stations, intermediate pigging stations, future tap-off stations, and receiving terminal including all types of equipment and material required for excavation/ construction of pits for equipment and instrument installations and steel/ structural steel materials of all types.

xxxii. All materials required for repair/ restoration of pavements, roads, bunds, walls, other structures affected/ damaged by Contractor's construction activities. Materials shall be equivalent/ superior to those used for original construction of the facility.

xxxiii. All equipment and consumables required for hydrostatic testing like pumps, pressure and temperature gauges, test water and corrosion inhibitors for test water for hydrostatic testing.

xxxiv. Supply of insulators, end seals etc. in case of cased crossings. CS conduit of 6" dia. for OFC shall also be used in open cut river crossing by strapping with

concrete coated line pipe.

xxxv. All materials, consumables and equipment required for welding and for all types of tests and NDT such as Computed radiography for mainline and for station piping, ultrasonic testing, magnetic particle, dye penetrate examination etc. including X-ray/ gamma ray machines, imaging plates, developing equipment, display equipment, and consumables, Ultrasonic equipments etc.

xxxvi. All safety tools, tackles, devices, apparatus, equipment etc. including ladders and scaffolding complete as required.

xxxvii. Steel materials such as structural steels, reinforcement steels and steel for all types of supports, foundations, ladders, platforms, etc.

xxxviii. All steel materials such as structural steel, reinforcement steel, shims, wedges, packing plates (machined wherever required), pipes, nuts & bolts, washers, U-bolts, anchor bolts, clamps, clips, pipe saddles/ shoes etc. as required for the fabrication of structural supports and supports basements/ foundations, platforms etc. Pipes supplied by COMPANY shall not be used for fabrication of supports and support saddles etc.

xxxix. All materials for corrosion protection of buried piping, pipe fittings, valves, casing pipes, etc.

xl. All materials and equipments related to blasting of rock/ controlled blasting for excavating trench, grading of ROU, pipeline & pipe laying/ installation and other works.

xli. All materials for surface type temperature element.

xlii. Mobilizing Pipe/ cable locator for locating existing pipelines/ cables.

xliii. All types of corrosion measuring instruments e.g., corrosion coupons, corrosion probes etc. wherever required as per specification.

xliv. Sand ridges (sand, polyethylene sheets etc.) and other materials for stacking of surplus pipes at Company’s designated storage yard.

xlv. Corrosion inhibitor, oxygen scavengers and bactericides for water used for hydrostatic testing including water for testing.

xlvi. Required quantities of nitrogen for idle time preservation and pre-commissioning of Pipeline and associated facilities, if required.

xlvii. Required quantities of nitrogen for commissioning of Pipeline and associated facilities.

xlviii. All pigs for cleaning, gauging, filling, dewatering, swabbing, drying, pre-commissioning and commissioning of the pipeline.

xlix. All materials i.e., fittings, flanges, valves, blind flange etc. required for isolation

and nitrogen purging for pipe section, manpower, equipment, pigs, consumables, nitrogen required for carrying out commissioning of pipeline along with necessary piping and instrumentation connection for monitoring flow rate, pressure, temperature etc. providing temporary facilities for venting/ flaring along with necessary piping, valves and instrumentation etc. shall be in contractor's scope.

I. All other materials not specified above but required for successful completion of the entire work whether temporary or permanent in nature.

The item rates quoted for the execution of the work shall be inclusive of supply of all materials mentioned above unless specifically covered otherwise under schedule of rates. The quantities indicated in schedule of rates under Contractor's scope of supply are approximate. Contractor shall carryout MTO of all materials required based on IFC general arrangement drawings, P&IDs and firm up the actual requirement of materials. All escalation/ extra materials procured by Contractor for contingencies shall be Contractor's property and no payments shall be made for such materials. Payment shall be made for actual materials installed by the Contractor as a part of permanent installation.

In case, any item is covered in scope of work but is not present in Schedule of Rates (SOR), it will be assumed that bidder has included cost implication of those items in their total price.

4.3 STORAGE OF MATERIALS

4.3.1 All materials shall be preserved against deterioration and corrosion due to poor or improper storage while under the custody of the Contractor.

4.3.2 All materials shall be duly protected by the CONTRACTOR at his own cost with the appropriate preservatives like primer, lacquer coating, grease etc. and shall be covered with suitable material to prevent them from direct exposure to sun, rain, wind and dust.

4.3.3 Whenever applicable, pipes shall be stacked according to the identification marks and stacks shall be arranged on sleepers/ sand pads at least 300 mm above ground.

4.3.4 The CONTRACTOR shall check that valves, fittings, specials etc. are not subjected to corrosion from hydrostatic test water remaining in the packing. Any such condition when detected should be brought to the notice of Engineer-in-Charge and remedial measures taken as directed.

4.3.5 All machined surfaces shall be properly greased and should be maintained and protected from damages.

4.3.6 Openings of equipment, machinery, valves etc. shall be kept blocked/ covered with blinds to prevent entry of foreign matter.

4.3.7 As far as possible materials shall be transported to the site of erection only just prior to the actual erection and shall not be left lying around indefinitely on ground but kept on packing/ sleepers etc. to maintain the minimum distance from the ground as

specified and/ or as per directions of Engineer-in-Charge.

5.0 INDICATIVE CONSTRUCTION MILE STONE

Contractor shall adhere to meet the indicative construction milestones enclosed as **Appendix-I to Particular Job Specification**. Contractor shall be responsible for close monitoring and completion of indicative construction milestone.

6.0 SCOPE OF WORK AND SCOPE OF SUPPLY FOR OTHER DISCIPLINES

Detailed scope of work and scope of supply covered in this document given above is pertaining to pipeline laying and associated pipeline terminal/ station piping works only. Detailed scope of work related to civil, architectural, structural, corrosion monitoring system, electrical, instrumentation, telecom, fire-fighting, etc. are covered in separate documents in detail and the same are enclosed elsewhere with the Bid document. All these documents shall be read in conjunction with this document and shall form an integral part of the overall Scope of work of the Contractor(s).

7.0 OTHER CONDITIONS OF BID

7.1 Basis of Work

7.1.1 All piping/ pipeline works shall be carried out as per following:

a) Piping and Instrumentation Diagram (P & IDs) and line schedule.
b) Approved for construction Piping General Arrangement Drawing (GADs).
c) Approved for construction Alignment sheets/ crossing drawings.
d) Piping Material Specifications.
e) Specifications
f) Piping support standards/ drawings and support index.
g) Any other drawings/ sketches prepared by Company and/ or by the Contractor and approved by the Company

7.2 Topographic Survey

The alignment sheets including plan and ground profile details, details of various crossings are enclosed along with the bid document for contractor's reference and information only.

It shall be the Contractor's responsibility to verify the pipeline routes. Wherein Contractor's opinion the survey and investigation data are not found to be sufficient in detail, it shall be the responsibility of the Contractor to collect/ arrange and provide such topographic surveys.

Further, successful contractor(s) after award of work shall immediately carry out topographic survey and geotechnical investigation of all crossings other than those provided by the company in the pipeline route and prepare crossing drawing for each crossing. The drawing shall be submitted for Company's approval. IFC alignment

sheet shall be issued based on the input of above crossing drawings.

The formats for crossing drawing to be used are enclosed with the bids. Contractor shall also incorporate the crossing details in the as built alignment sheet after completion of work.

Contractor shall also perform any additional topographic surveys and geotechnical investigations that may be required for local detours or at crossings or at any other location during execution of the project without any extra cost to the COMPANY. Pipeline alignment shall be marked on village maps by CONTRACTOR wherever detouring is beyond existing ROU. CONTRACTOR shall be deemed to have considered such eventualities while formulating his bid.

7.3 Alignment Sheets and Station Drawings

Surveyor Alignment Sheets and crossing drawings are included in the Bid package. The details of class location, crossings details are separately enclosed. These drawings/ details are indicative only and are furnished to enable to estimate the quantum of work and to quote a firm price for the work.

Final drawings marked "Issued for Construction (IFC)" shall be furnished by COMPANY to CONTRACTOR at project execution stage after submission of crossing drawings by the Contractor as per mentioned elsewhere in the bid.

Typical station drawings are also included in the Bid package. These drawings are marked as "Tender Purpose Only".

The IFC (Issued for Construction) drawings issued during project execution stage may vary from the drawings included in the Bid Package. CONTRACTOR shall carry out all works in accordance with these IFC drawings at no extra cost to the COMPANY.

7.4 Description of Pipeline Route

7.4.1 Route Description

From OIL CGGS Madhuban (Duliajan) to existing SV-14 of GNPL (Jorhat)

The proposed 24" NB Duliajan mainline (Duliajan to Jorhat) will offtake from CGGS Madhuban of OIL and will run along the existing RoW of BCPL/ ONGC and cross country up to the terminating point at SV-14 GNPL of IGGL. The pipeline route lies in Districts of Dibrugarh, Sivasagar and Jorhat in the state of Assam. 90% of the terrain along the proposed route is flat and the remaining 10% is slightly undulating. The pipeline crosses tea-gardens in various stretches. The alignment runs generally southwest, traversing predominantly agricultural lands, scattered habitations, and several streams and drainage channels. The terrain is mostly flat to gently undulating, with isolated low-lying marshy stretches near rivers that may require dewatering or trenchless techniques. For details refer Pipeline Network Schematic Diagram No. MEC/05/28/E/0085/M/1021 Rev-1.

Further, **to minimize fresh land acquisition and associated disturbances, substantial portions of the alignment are proposed within the existing Right of Use (RoU) corridors of BCPL, ONGC and few portion of existing NEGG network pipeline, while the remaining sections**

require acquisition of fresh RoU. It may be noted that only about 39.3 Km ROU is fresh ROU. Rest of the pipeline shall be laid for 75.948km in the existing shared ROU of BCPL, 52.942 km in existing shared ROU of ONGC, 0.213 Km in existing shared ROU of STF Madhuban, and 6.556 km in existing shared ROU of other IGGL pipelines. Chainage wise ROU details are as follows:

S. No.	ROU Category	Length (in m)	Remarks
1	BCPL	75948.037	
2	Fresh RoU	39300.444	
3	IGGL	6556.470	
4	ONGC	52941.894	

Approved Standard Operating Procedure (SOP) as well as all the conditions specified by the existing ROU entity to be followed without any cost implication for laying of pipeline in the shared ROU.

Further, following details may be noted regarding width and existing ROU of ONGC:

S. No.	ROU Sector		Width of ROU	Nos. and Dia. of pipelines in ROU corridor	Remarks
	From	To			
1	Jorhat CTF	Geleky CTF	15 Mtr.	1 no. (14")	1) At three locations ONGC has laid pipeline in OIL's ROW due to space constraint. Total length 1.0 km approx. OIL ROU 2) At some locations (12 to 14 nos.) space constraint prevails in laying line due to development / houses
2	Geleky CTF	DJP	25	3 nos. (16", 12" & 12")	
3	DJP	Lakwa CTF			
3(i)	DJP	LKM GGS-4	18	3 nos. (20", 12" & 12")	
3(ii)	LKM GGS-4	LKM ETP-WIP	18	8 nos. (20", 12", 12", 12", 10", 6", 4" & 4")	1) ROU from LKM GGS-4 to Lakwa CTF/GGS-1 approx. 8.5 km is fully occupied with 8 to 6 numbers of pipelines and hence may have space constraint.
3(iii)	LKM ETP-WIP	Lakwa CTF / LKW-GGS-8	22 – 40	6 nos.	Remarks same as above

				(20", 12", 12", 12", 12" & 10")	
4	Lakwa CTF to Moran CTF		15	1	

From DT at BCPL Source, Lepetkata to RT cum Injection point at SV-03

The proposed IGGL Pipeline section is planned from Source BPCL station at Lepetkata to proposed Injection point of IGGL for Lepetkata (Duliajan Feeder Line). The total proposed pipeline length is approximately 6.00 km.

The ROU consists of a combination of fresh ROU, Forest ROU and BCPL ROU.

S. No.	ROU Category	Length (in m)	Remarks
1	BCPL	4380.2	
2	Fresh RoU	572.92	
3	Forest	1046.88	

7.4.2 The number of crossings and features along the pipeline route described above are approximate. CONTRACTOR shall not be entitled for any compensation in terms of time and cost in case of variation in the above. Contractor shall verify the above data and carry out pipeline installation works without any extra cost & time to COMPANY.

7.4.2 The number of crossings and features along the pipeline route described above are approximate. CONTRACTOR shall not be entitled for any compensation in terms of time and cost in case of variation in the above. Contractor shall verify the above data and carry out pipeline installation works without any extra cost & time to COMPANY.

7.4.3 Contractor to note the presence of Leopard, Snakes and other wild animals in the pipeline route especially near forest region.

7.4.4 Contractor shall carry out subsurface utility survey along the ROU/ROW or proposed pipeline route and/or as specified by Engineer-In-Charge for provided ROU/ROW/Corridor (Min. 5 meter) using Ground Penetrating Radar (GPR) for depth up to 5m below the existing ground level to locate and identify all existing underground utilities/buried objects including but not limited to pipelines, sewers, conduits, cables, drains, manholes, appurtenances etc in the proposed corridor along with location, DGPS coordinates, depth, shape and dimensional details of utilities

7.5 Soil Investigation and Soil Resistivity survey

COMPANY has carried out soil investigation (visual classification/ stratification) and resistivity survey along the entire pipeline route. Data collected from such surveys is enclosed with the bid package. Such data is issued to CONTRACTOR for his reference purposes only. It shall be Contractor's responsibility to verify the data and satisfy himself with regard to accuracy and utility of data. CONTRACTOR shall carry out any

additional soil data/ investigation required for installation. CONTRACTOR shall not be entitled for any compensation in terms of time or cost in case of any variation in actual site conditions from the data furnished in the bid package. It shall be Contractor's responsibility to familiarize himself with sub-soil conditions along the pipeline route and workout the lengths of pipeline to be laid in different subsoil conditions including the quantum of rock excavation that would be necessary.

7.6 Pipeline R.O.U.

Contractor shall carry out construction work within the width of pipeline ROU as made available to them with no time and cost implication to the Company. The Contractor shall arrange any additional ROU requirement for construction purposes. It shall be Contractor's responsibility to make arrangement for any additional land required for fabrication, construction, storage and all other work areas. In certain restricted areas such as private holdings, congested and plantation areas etc. ROU may be restricted to a width of 3-5 meters. In forest areas only 10 m ROU will be made available to the contractor. Contractor shall propose suitable execution methodology and time schedule for construction/ execution of work at areas of restricted ROU and deploy adequate equipment & manpower etc. as required. Contractor shall also arrange additional land during installation of Pipeline by HDD.

Damages, if any, to existing pipeline and facilities shall be Contractor's account.

Wherever the detouring is carried out beyond ROU during pipeline installation, the detoured pipeline alignment shall be marked on village maps by the pipeline installation Contractor.

7.7 PIPELINE PASSING THROUGH CITY AREAS

In case the pipeline passes through city areas, it will be laid generally in the carriage way. Wherever it is not possible to lay the pipe line on the carriage way for any reason whatsoever, the pipeline will be laid on service road / footpath. It will be the responsibility of the Contractor to identify all the underground utilities after surveying the area along the gas pipeline route and lay the pipeline with clear distance of minimum 20 cm from other existing utilities like cable, water pipeline etc. In case of hydrocarbon pipeline the clear distance shall be 50 cm minimum or as per code.

7.7.1 RESTRICTION OF ROU

- In congested urban/industrial areas where the exact location of the existing services (aboveground as well underground) is not known, the contractor shall contact the concerned authorities to get the permission to cross the existing utility including approval of the final alignment of the pipeline before commencement of work. Contractor shall obtain the Digging Permit from the respective authority. In addition to this acquisition of NOC from the respective utilities' companies will be also in the scope of the contractor.

- In some areas due to several underground obstacles encountered during construction, mechanical trenching may not be possible. In such cases Contractor shall perform the work by manual means without any Cost as well as time implications.

- The contractor shall finalize the alignment of pipeline by making the trial pits at

regular intervals in order to ensure the location of existing underground utilities.

- In urban/ Industrial areas where there are numerous underground utilities, the cover of 1.0m /1.5 m may not be sufficient; Contractor will not raise any compensation for any such necessary deepening. Due to deepening of trench, it may be required that shoring of trench may be required to avoid collapse of the same along the road. The same shall be done by the contractor without any cost implications.

- Due to restriction by statutory authorities, the Contractor may not be allowed to work during monsoon season. Thus, for such areas the contractor shall plan his work accordingly and submit his schedule to relevant authorities without any time as well as Cost implication.

- In city areas where, due to restrictions by the statutory authorities, the movement of heavy machinery is not allowed, the laying /Construction activities shall have to be carried out manually. Only tire mounted equipment such as Hydra/ JCB etc. will be permitted with consent of the concerned authorities.

- The authorities may impose stringent conditions for laying the pipeline in certain areas like limited length of working section, night work shift only etc. Thus, the contractor must submit his working methodology to relevant authorities in order to obtain the necessary permission for laying the pipeline prior to commencement of work.

- Due to non-mobilization of the heavy machinery and due to underground utilities, the welding of long pipe string above ground and lowering may not be possible, therefore welding may need to be carried out in the trench by making bell holes for individual pipe or small sections of pipe.

- To comply with the agreed work schedule, the contractor may work in shift or extended hours.

  The Contractor shall be deemed to have taken into consideration all variations as mentioned above at the time of formulating his bid and no extra compensation either by way of time or cost shall be admissible.

7.7.2 PARTICULAR INSTRUCTIONS

- In Principle all statutory permissions from all concerned shall be obtained by IGGL. However, all activities related to liaison, co-ordination etc. with all authorities needed to achieve the work as per schedule will be under Contractor's scope including taking work permit/ Digging Permit before commencement of work. Contractor shall also inform and seek necessary permission from the local traffic police before commencement of trenching work.

- For access route to the working strip, the Contractor will be responsible to negotiate with the relevant owner, tenant or authorities. Any deemed compensation will be borne by the Contractor.

- The contractor shall be responsible for overall entire quality control activities for the present project.

- Contractor proponent shall have to take prior approval of concerned Government agencies while carrying out blasting wherever required.

- Contractor proponent shall have to take preserve top soil dug and shall be restored to original condition on completion of the work.

- Owner shall obtain permission from the Forest department. However, required assistance to get the permission from the respective authorities, necessary liaison, co-ordination etc., with the authorities needed to achieve the work as per schedule including taking work is in the Contractor's scope.

- While carrying out the laying activities any damage to other utilities to be repaired by the contractor to the full satisfaction of the utility agency. Any claim arises out of damage of other utilities shall be borne by the contractor.

- Contractor proponent shall construct the pipeline and other infrastructure and adopt safety measures as per the standards & specification laid down by the concerned agencies from time to time.

- Contractor proponent is required to comply with the manufacturing, Storage and import of Hazardous Chemicals Rules -1989 framed under the Environment (protection) Act 1986.

- On completion of all temporary work structures, surplus materials and wastes shall be suitably disposed off.

- Similarly, any additional conditions issued by statutory authorities will also have to be complied with by the contractor without any cost implications.

7.7.3 PREPARATION OF THE CONSTRUCTION SITES

The overall duration of the works at every point of the pipeline route, from the opening of the working area to lowering of pipeline and trench backfilling shall not exceed the permit condition of relevant authority.

7.7.4 WORKING STRIP

No ROU exist for the city portion line along the authority land. Working strip may be available along the road side for the construction site. Contractor should deploy suitable equipment and adopt their working methodology accordingly.

7.7.5 REDUCING THE WORKING STRIP

Contactor shall not be compensated for any reduction in the width of working strip.

7.7.6 REVERSE OF THE WORKING STRIP

No fencing of any kind along the pipe route is essential to be provided. However, it remains the responsibility of the Contractor to barricade the area of open trenches so that no untoward accident takes place.

7.7.7 EXCAVATIONS (UNDERGROUND OBSTACLES)

In congested area or if deemed necessary by Owner's Engineer or concerned authorities where numerous utilities may be encountered the contractor should carry out the excavation manually without entitlement of any compensation.

7.7.8 REINFORCED CONCRETE SLABS AS MECHANICAL PROTECTION FOR THE

PIPE

Crossing of utilities will be done by invariably going below the utilities maintaining a clear gap of minimum 20 cm except hydrocarbon pipelines. From hydrocarbon pipelines, clear gap of minimum 50 cm shall be maintained. If due to site constraint it is not possible to lay the pipeline as per the above cover requirement, Contractor shall initiate the proposal for approval of Deviation and obtain written permission from EIC.

7.7.9 DELETED

7.7.10 MARKERS

Pipeline Warning Markers to indicate presence of pipeline and chainage shall be provided all along the pipeline route at a maximum spacing of 1 Km. The markers shall also be provided on each side of highways (NH/SH), major district roads (MDR), all metalled roads, railway crossings and water body crossings. At other crossings where third party activity is expected and at entrance to stations one marker shall be provided.

For urban Agglomeration (UAs) / Towns having a population of 1 lakh or more, the warning marker shall be installed at least at every 50 meters and if required additional markers shall be installed where there is possibility of damage or interference.
Pipeline Warning Sign shall in general be installed at

- National and State Highway Crossings- 2 Nos.
- Other Road Crossings-- 2 Nos.
- Railway Crossings—2 Nos.
- Minor Water Crossings (less than 15m width) --1 No.
- Minor Water Crossings (above 15m width) -- 2 Nos.
- Major Water Crossings--2 Nos.
- Station Approach---1 No.
- And at any other location as shown in the approved drawings and as directed by the COMPANY.

Pipeline Warning Sign shall identify the existence of the pipeline. Warning Marker shall have information written in the Hindi/ Regional Language & English, with IGGL's LOGO with a caution and contact details.

Kilometre/ Aerial markers – Kilometer Marker shall be provided at a spacing of 1 Km and Aerial marker at a spacing of 5 Km along the pipeline route. The Aerial Markers can be treated as Kilometer Markers and the Aerial/ Kilometer Markers having warning details can also be treated as Warning Markers.

Right-of-Way boundary markers shall be installed at every 250 metres interval along the entire pipeline route. These shall be installed on either side of the pipeline alignment to define the ROW boundary limits. These shall also be installed at pipeline turning points to maintain the continuity of the ROW limits.
In urban agglomerates (UAs)/ towns having a population of 1 lakh or more, pipeline route marker shall be installed at least at every 25 meters.

Special Marker shall be installed at Location where the following changes take place:

- Change in pipeline diameter and wall thickness.
- Change in type of pipe.
- Change in class locations for pipeline conveying gas.

The above data may be provided on other types of markers (except ROU boundary

marker), if the relative distance between the two does not exceed 100 m.

The following markers should be installed at river crossings: Four markers at large water body crossing. Typically, primary upstream & downstream markers should be installed within 50 m from edge of both banks (upstream & downstream) of the water body crossings. Secondary upstream & downstream markers should be installed preferably at punch-in/ start & punch out/ end of crossings. In case same is not possible, the same may be installed within 50 m beyond punch-in/ start & punch out/ end of crossings at convenient place.

In case of parallel co-location, primary upstream & downstream markers should be installed at entry & exit of water body within 100 metres of pipeline. Secondary upstream & downstream markers may be located approx. 50-100 m away from first markers at convenient place. Additional markers may also be installed if parallelism is more than 100 m. Inter-distance between the markers should be 50 -100 m.

7.7.11 DIRECTIONAL MARKERS

Direction markers shall be installed to identify the significant turning points of the pipeline during aerial traverse. One direction marker shall be installed at each turning point, in addition, two more direction markers shall be installed along the pipeline alignment, one on each side of the turning point at 150m from the turning point.

7.7.12 EXCAVATED MATERIAL

- The excavated material shall be placed in such a way as to avoid any inconvenience to property owners, or interference to the circulation of pedestrians or vehicles as well as to the operation of near-by installations. The excavated material shall be piled up in such a way that they enable the watering of the trees. No excavated material shall be piled up in the road crossings. It may be insisted upon by the authority to remove all the excavated materials immediately after trenching.

- To prevent the excavated stone and earth from falling into the trench, a strip 20cm shall be left clear between the edge of the trench and the bottom of the pile of excavated earth. This width may be increased, according to the nature of the ground and the atmospheric conditions.

- Wherever necessary, the contractor is required to remove the excavated material from the site and to be kept at a dump yard until the trench is to be back filled and to be brought back to the site for backfilling.

- When the excavated material is judged by the Engineer to be unsuitable for re-use, the Contractor shall remove it from the site as the digging of the trench proceeds and shall supply in its place suitable material approved by the Engineer-In-Charge.

- Contractor is required to arrange the steel plates (preferably 1.5 meters wide X 20 mm thk) to place on the excavated trench for smooth movement of traffic.

7.7.13 SIGNALLING, FENCING AND LIGHTING

- Each site shall be provided with an identification board mentioning the reason for the work and the names of the Company, the Contractor and the

Consulting Engineer, as stipulated in the special specifications.

- At both ends of the trench, the Contractor shall install 2 traffic and warning signs, and Display board one immediately close to the trench and the other ahead, as required by the Engineer-In-Charge.

- The Contractor shall install lights and warning lights around all working areas, in accordance with the special specifications. The voltage shall conform to the safety regulations in force.

- The Contractor shall install barricading and lighting of all trial-holes, trench sections and other excavations.

- The Contractor shall provide watchmen wherever deemed necessary for the safety of the public and of the workers, in particular as regards working sites, on site material stockage, temporary dumping yards, etc.

7.7.14 BARRICADING

The contractor shall provide the barricades of size 2m wide X 1.5m high of wooden/plastic/steel with necessary supports along the open trenches to protect/caution the public about the digging work without any cost to owner. The barricades shall be painted as per the requirement of authority with the owner's/Consultants/Contractor's details, job being carried out, cautions, in convenience captions, etc. also needs to be provided.

7.8 Site visit

Bidders are advised to make site visits to familiarize themselves with all the salient features of subsoil, terrain and available infrastructure along the pipeline route. Contractor shall be deemed to have reasonably considered all constraints and eventualities on account of site conditions along pipeline route while formulating his bid. Contractor shall not be eligible for any compensation in terms of cost and/ or time, on account of site conditions along pipeline route varying to any extent from whatever described in the Bid Package and the drawings furnished along with the Package.

7.9 Line pipe and Coating

7.9.1 Taking over of Pipes

COMPANY shall supply bare, externally corrosion coated with 3-layer polyethylene coating and internally epoxy coated line pipes.

Contractor shall receive and take over the pipes progressively as per construction requirements at designated place of issue in presence of Company's representative. At the time of taking-over, Contractor shall perform inspection of pipes and pipe coating for all defects in the presence of Company's Representative. COMPANY shall be liable for repair defects and damage to pipe coating noticed at the time of taking over. However, installation Contractor shall repair all defects to pipe and pipe coating occurring after taking over including those during transportation and handling. Rebuffing for dents (in bevels) less than 1 mm in depth shall be carried out by Contractor ahead of welding in the field at no extra cost to COMPANY. Contractor shall take-over the entire quantity of bare and coated line pipe from storage yard after

completion of installation works. Return of surplus line pipe material to Company's designated storage yard is in installation Contractor's scope including loading, transportation, unloading, handling, stacking of pipes at storage yard and getting the pipes inspected to Company's representative at storage yard.

7.9.2 Repair of Coating

CONTRACTOR using suitable material compatible with parent coating system shall carry out any repairs to 3-layer polyethylene coating. The coating repair material and procedure for application shall be submitted to COMPANY for approval prior to start of construction.

7.10 Statutory Permissions

The COMPANY shall obtain a general permission from the various authorities having jurisdiction over the area as necessary for construction of the pipeline. CONTRACTOR shall obtain the necessary permits like work permit/ excavation permit/ trench opening permit etc. for all works from the authorities having jurisdiction before the actual execution of various phases of the works and all stipulations/ conditions/ recommendations of the said authorities shall be strictly complied with at no extra cost to COMPANY. CONTRACTOR shall also obtain all necessary permissions from the concerned authorities for installation of pipeline at railways, roads, water crossings and at places where blasting is required. COMPANY may, however, assist CONTRACTOR in obtaining such permissions, wherever required, by issuing recommendation letters etc. In case of damage to other utilities/ infrastructure, Contractor shall be responsible and the required compensation as per the directions of concerned authorities/ COMPANY shall be paid by the Contractor. After completion of work, Contractor shall obtain a certificate from the concerned authorities that the job has been completed as per their requirement and the area/ land has been restored to their satisfaction.

7.11 Controlled Blasting

In case blasting is required for making of trench for laying pipeline, it shall be responsibility of the contractor to ensure safety of pipeline while carrying out blasting operations. The controlled blasting procedure shall be subject to approval of Company.

7.12 Environmental Restrictions

The following measures shall be adopted during pipeline construction in order to minimize the impact of pipeline construction activities on the environment.

7.12.1 While working in plantation areas, Contractor shall take due care to minimize the damage of trees. The number of trees felled shall be restricted to minimum based on working requirement for pipeline installation. In the paddy field area, Contractor shall exercise maximum care not to damage the crop outside the ROU. The compensation of damage of crop outside ROU, if any, shall be to Contractor's account. Damage to any obstruction, temporary/ permanent structure, boundary walls etc. within ROU shall be repaired, restored and shall be to Contractor's account.

7.12.2 During ROU clearance, the vegetation shall be cut off at ground level leaving the roots

intact to the extent possible. Only stumps and roots directly over the trench shall be removed for pipeline installation.

7.12.3 Intake and discharge of water required/ used for line flushing and testing should not cause unacceptable environmental disturbance. During dewatering process, proper drainage arrangement shall be made to discharge the hydro-test water to avoid flooding of the nearby area.

7.12.4 As far as possible, the contractor shall ensure that river and stream crossings are done during dry season to avoid disturbance of breeding grounds and soil erosion. The riverbed, embankments and dykes shall be restored adequately after installation of crossings.

7.12.5 The contractor shall exercise adequate care while working, in order to avoid damage to forests and wildlife.

7.13 Pipeline through Seismic Areas

The requirements specific to safety of pipeline against seismic activity:

a. Backfill for pipeline trench at locations where the pipeline crosses the faults should be provided with loosely compacted (unit weight<1.8 t/m³) cohesion less soil for a distance of 1 km on both side of such crossings. The angle of friction of cohesion less soil to be used for backfilling should not be more than 25º.

In case the dug-out soil of the trench is clayey in nature (undrained shear strength greater than 0.5 T/m²), the local soil shall be replaced by engineered (cohesion less) backfill as mentioned in previous paragraph. Otherwise, the same dugout soil can be used as backfill. The recommended backfill shall be at least 600 mm thick all around the pipeline. Extra digging of trench shall be carried out to provide 600 mm cohesion less soil all around the pipeline.

b. If the fault crossing zone, the pipeline is in rocky terrain, the following recommendation is made.

When the pipeline is to be laid on a rocky terrain, the stones/ boulder/ rock dugout from the trench should be crushed such that maximum size of stone/ boulders is limited to 20 mm. The crushed stone should be mixed with locally available soil, before using as backfill. Alternatively, 150 mm sand padding shall be provided all around the pipeline before crushed boulders/ stones are placed over the sand padding. In this case the size of boulders can be increased up to 100 mm.

c. A minimum gap of 100 m shall be maintained between two successive bends of the underground pipeline where the deflection angle is more than 45º. Rerouting shall be carried out in consultation with Company incase minimum gap could not be maintained.

7.14 Pipeline Burial

The pipeline shall be buried normally at a depth of 1.2 meter except ***river/ rail/ road/***

canal/ water crossings/ paddy fields where cover shall be as given below or as per the requirements of statutory/ local authorities whichever is more stringent. Increased wall thickness (as indicated in alignment sheets) and cover shall be provided at critical locations and at crossings.

The pipeline, in general shall be laid underground with minimum cover as given below.

Sl No.	**Locations**	**Minimum Cover** (In Mtr.)
i.	Agricultural, plain barren land etc. where human activity is insignificant	1.0
ii.	Industrial, Commercial and Residential area	1.2
iii.	Lined Canals	1.5
iv.	Unlined streams, canals & minor water crossings	1.5
v.	Drainage ditches at roadways & railways	1.2
vi.	Rocky areas	1.0
vii.	Uncased/ cased road crossings	1.2
viii.	Railway crossings	1.7
ix.	River crossings (below scour level)	2.5
x.	River crossings (below scour level)- Rocky	1.5
xi.	Other areas	1.2

In case, any private dwelling, industrial building or place of public assembly falls within 15m of pipeline, additional cover of minimum 300 mm shall be provided over and above the cover indicated in the above table. Additional soil covers other than specified above shall be provided at locations indicated by statutory/ local authorities as per agreements between COMPANY and authorities.

7.15 Crossings

For all rails, road, canal, river & other water crossings, Contractor shall liaison with relevant authorities and intimate them well in advance about the schedule and methodology of crossing. It shall be obligatory on the part of the laying Contractor to ensure that Authorized Representative of the authority under whose jurisdiction the crossing falls should be made available at site by the Contractor at the time of making crossing. After completion of works and complete restoration of ROW, Contractor shall provide NOC from the relevant official pertaining to complete restoration to their satisfaction and certification in respect of no other damage caused to their property outside the earmarked ROW.

7.15.1 Railway Crossings

In case of permission by Boring: Pipeline at railway crossings shall be provided with a casing pipe. The casing pipe shall be three nominal pipe sizes larger than carrier (unless advised otherwise by concerned authorities) and shall be installed by boring/

jacking/ HDD/ ramming. Internal of Casing pipe shall be coated with two-component epoxy coating wherever required by statutory authorities. It should be noted that the extent of casing pipe generally specified by Railways is 14.0 m beyond centerline of the outermost tracks on either side or 0.6 meter beyond the ROU/ROW limits of Railways on either side, whichever is more. Carrier pipe shall be electrically insulated from the casing pipe and casing ends shall be sealed using durable, electrically non-conducting materials. The crossing drawing shall be subject to approval of concerned Railway Authorities prior to implementation. The railway crossing shall comply with the requirements of API 1102 and Indian Railways regulations. The crossing angle shall be as close to 90° as possible. Cover of casing pipe for railway crossings shall be minimum 1.7 m wherever railway track is on embankment. Care shall be taken to isolate the pipeline crossing installation from aerial electrical wires and shall be suitably insulated from underground conduits carrying electrical wires. The casing pipe shall be provided with minimum 50 mm diameter vent pipe. Casing vent pipe shall be at least 1.2 m away vertically from aerial electrical wires and shall be suitably insulated from underground conduits carrying electrical wires on railway land. Casing pipe should be so placed and oriented so as to prevent any leakage inside railway boundary except through the vent pipes. The casing pipes shall be installed with even bearing throughout the length.

In case of permission by HDD: If railway authority grants permission for crossing of railway by HDD method, pipeline shall be laid at least 7 m below the ground level throughout the railway land width embankment and also at least 7m below formation level in cutting throughout land width.

Further, as per railway Guideline on Pipeline Crossing under Railway track, in case of pipelines carrying gas, Railway operations should be considered equivalent to Location Class 4 for design of carrier pipe thickness. Design factor of 0.4 shall be used for calculating wall thickness of carrier pipes within railway land and up to a distance of risk radius outside the railway boundary (ROU/ROW) on either side.

7.15.2 Road Crossings

i. The method of crossing of roads such as open cut/ trench-less shall be firmed up by CONTRACTOR in consultation with concerned authorities and COMPANY. The CONTRACTOR shall also take due care to identify and take due precautions so as not to disturb or damage the utilities like cables, water lines and other structures.

ii. After laying the pipeline in a road crossing by open cut method, the CONTRACTOR shall completely restore the road to its original condition.

iii. While laying the pipeline in road crossings by open cut method the CONTRACTOR should ensure that the traffic is not stopped during the execution of work. This may be done by cutting half of the road at a time so as to enable the traffic to pass on the remaining half of the road. Alternatively, the CONTRACTOR can provide diversion roads to maintain the flow of traffic. For NH crossings, traffic of both sides shall not be disturbed.

iv. The CONTRACTOR shall provide proper caution boards during daytime and danger lights during night time when the cutting operation of the road is going on.

v. For cased crossings, the pipeline should be taken through the casing pipe, the top of which should be at least 1.2 meters below the road top as specified or as per the requirements of the local authorities, whichever is higher. Casing pipe shall extend min. 600 mm beyond Road ROU/ROW on either side. The casing pipe shall be installed by trenchless method like boring/ jacking/ HDD. The casing pipe shall be three nominal pipe sizes larger than carrier pipe. The crossing angle shall be as close to 90º as possible. Casing insulators and end seals shall be provided to ensure electrical isolation of carrier pipe and casing pipe.

vi. For National Highways/ state highways, crossing shall not be too near the existing structure on the NH maintaining a minimum distance of 15 meters or as specified by Highway Authority.

vii. The National Highway crust shall be built to the same strength as the existing crust on either side of the trench or to thickness and specification stipulated by Highway Authority. Care shall be taken to avoid the formation of a dip at the trench.

7.15.3 Canal/ Drain/ Other minor water crossings

i. Canal and other water crossings shall be carried out by open cut/ trench-less technology method. CONTRACTOR shall firm the method of crossing in consultation with concerned authorities and COMPANY.

ii. HDD method shall be adopted for river/water/ canal crossings that are specifically mentioned in this document or decided at site by Engineer-in-charge. These crossings shall be installed and paid separately as per schedule of rates.

iii. No damage should be caused to any irrigation sources, while laying the pipeline through canal crossings.

iv. The flood banks of the River/ Canal should be brought to the original condition, if they are damaged by the laying of the pipeline. **Stabilization of banks** shall be carried out as per requirements of concerned authorities.

v. The detailed construction methodology/ plan and time etc. shall have to be finalized by CONTRACTOR in consultation with concerned authorities having jurisdiction over canals/ rivers. COMPANY shall provide assistance by providing introductory letters.

7.15.4 Existing Pipeline Crossing

The specific requirements of Owner / operator of existing pipeline shall

generally be followed. The minimum clearance between the lines shall be 500 mm below existing pipeline unless specified otherwise. Further, in case existing pipeline is being crossed by HDD, min. clearance between the lines shall be min. 1m below the existing pipeline unless specified otherwise. All conditions specified by existing pipeline owner shall be adhered.

7.16 Pipeline in Forest Areas

a. Contractor shall restrict the pipeline laying activities within the ROU acquired. No additional land in forest area shall be used. Contractor shall clear only the minimum width required for laying of pipeline. Number of trees/ plants felled shall be kept a minimum based on construction requirements. ROU width in forest area is 10 m. or less.

b. Full care shall be taken to ensure that no damage is caused to the adjoining forest area while carrying out the work. However, in case of any damage, Contractor shall be liable to pay suitable compensation as per requirements of Forest Department.

7.17 Installation of Conduits for Optical Fibre Cable at Crossings

At all crossing locations (viz., rail, road, canal and minor water course crossings) the optical fibre cable shall be installed inside a HDPE Telecom Duct to be installed by the CONTRACTOR.

At all such crossings where the carrier pipe is installed by open-cut of the facility crossed, HDPE conduit shall be installed along with the pipeline for installation of the Optical Fibre Cable. At river crossings where anti buoyancy measures are provided for the carrier pipe, HDPE conduit shall be placed inside a CS casing pipe and shall be strapped to the mainline at 5m interval using high strength PE straps. Net specific gravity of pipe in empty condition should not be less than 1.2.

In any case OFC conduit shall not be installed in casing of carrier pipe.

7.18 CATHODIC PROTECTION WORKS

Cathodic Protection (CP) of the pipeline section shall be in the scope of the CONTRACTOR. For details of Cathodic Protection works, refer the enclosed **Annexure–I: Cathodic Protection Works**

7.19 Hydrostatic Testing

7.19.1 Pipelines

Hydrostatic testing of mainline shall exclude valves at terminals, SVs and facilities that are to be installed as a part of the scrapper stations. Temporary test headers shall be provided and the mainline shall be hydrostatically tested between the temporary test headers only.

The highest point of the test section shall be subjected to the minimum test pressure as specified below. The minimum hydrostatic test pressure in the pipeline during testing shall be as follows:

- **1.5 times Design Pressure**

The maximum hydrostatic pressure shall not however exceed the pressure required to produce hoop stress equal to **95% of SMYS** of pipe material based on the minimum wall thickness in the test section. The test duration shall be **24 hrs**. Hydro test shall be done with corrosion inhibitor, wherever required. Mainline valves shall be installed after successful completion of hydrostatic pressure testing.

If the pipeline commissioning after pressure testing (i.e., hydrotest) is anticipated to be delayed beyond six (06) months, the pipeline section shall be dewatered, dried and filled with nitrogen at a positive pressure of min. 2 barg or as directed by EIC.

Station piping to be tested hydrostatically for minimum 6 hours at pressure of 1.5 times Design Pressure.

The pipeline string of HDD crossing shall be pre-tested for min. 6 hours and post- installation testing for min. 24 hours at 1.5 times the design pressure.

The pipeline string of 500 m. and above shall be hydro-tested (post-installation) as per mainline hydrotesting procedure.

Control and instrumentation piping, actuators to be tested by Dry air or nitrogen at pressure of 1.1 x MOP (design pressure), test time– soaping time.

Subsequent to separate hydro testing of pipeline and associated facilities, the Contractor shall carry out tie-in/ hook up. Pipes/ prefabricated assembly used for such tie-in shall be pre-tested to a test pressure specified for the pipeline. The Contractor at no extra cost shall provide all materials required for the fabrication of the test headers to Company. After successful completion of hydrostatic testing, the Contractor shall de water the pipeline as per the directions of Engineer-in-charge.

For HDD, Pre-hydrotest, post-hydrotest and pipeline final hydrotest, contractor has to arrange soft water in view of alkalinity/ Salinity in the river water.

7.19.2 **Dewatering and Swabbing**

It is envisaged that dewatering and swabbing operations shall be carried out as a part of pre-commissioning activities. Contractor shall take up dewatering of pipeline after hydrostatic testing only when Contractor is ready for swabbing operations. Till such time Contractor is ready to start pre-commissioning activities, the pipeline/ section of pipeline after hydrostatic testing shall be left filled with inhibited water. In case, if contractor proposes to dewater any test section for any reason depending upon site conditions (e.g., using test water for adjoining section due to non-availability of water), the Contractor shall swab such sections as per applicable requirements of Contract and fill the section with nitrogen at a pressure of 2 bar (g) with residual content of oxygen less than 1% v/v at no extra cost to the company.

In no case shall the pipeline be kept empty i.e., without nitrogen filling.

Transfer of test water from one test section to another section may be considered, however dosing additional quantity of corrosion inhibitor shall be done.

Disposal of water (hydro testing) shall be done by Contractor after seeking necessary

permission from concerned authority/ land owner so that no liability on this account comes on COMPANY.

7.19.3 **Corrosion Inhibitor (Wherever applicable)**

The products to be used for corrosion inhibition of the water used for hydro testing and their dosage shall be as specified in Hydro test specification.

Contractor (not the inhibitor manufacturer) shall get the inhibitor tested for corrosion inhibition and microbiological control efficiency from competent Govt/ PSU Laboratory. The test report shall be submitted to COMPANY for approval prior to undertaking hydro testing works.

The dosage as recommended by COMPANY shall only be adopted.

Necessary records for dosing of inhibitor should be maintained by the laying Contractor and such records should be handed over to COMPANY.

7.19.4 **Terminal Facilities**

Piping facilities between the insulating joint and hook up point/ battery limit, sectionalizing valve stations and all above ground facilities installed by Contractor shall be hydrostatically tested to a test pressure equivalent to 1**.5 times design pressure** as per "Flushing and Testing of Piping System" enclosed with the Contract document. All valves in the piping network being hydro tested shall be kept in the crack open position. Holding time shall be **minimum six hours**.

7.19.5 **Preservation**

The positive pressure shall be maintained at 2 bar (g) in the pipeline during preservation. The necessary arrangements like valves, fittings, manpower etc. shall be kept for maintenance of pressure in the pipeline during idle time.

7.20 **Direction of Construction**

The direction of construction shall be in the direction of flow, unless specified otherwise. In case the contractor proposes to carry out construction in direction opposite to direction of flow, the contractor may do so at no extra time and cost to Company and subject to Company Approval.

7.21 **Leak Detection**

CONTRACTOR shall submit a detailed procedure for leak detection during hydro test. Such method of detection shall consume minimum possible time to complete the hydro test activity within contractual completion schedules. This procedure needs approval of the Engineer-in-charge.

All works for locating and repair of major leak/ burst attributable to COMPANY (occurred during hydrostatic testing) including necessary repairing/ replacing/ cutting and removing out defective pipe length as defined in the specification and shall be payable as per relevant items of schedule of rates.

All works for locating and repair of minor leak attributable to COMPANY (occurred during hydrostatic testing) which require sectionalizing of pipeline shall be payable as per relevant items of schedule of rates.

Contractor shall carry out repairing/ replacing of defective pipe length including cutting and removing of defective pipes, pre testing of replacement pipe for 24 hours and welding into main line, NDT of the welds, coating of the weld joints, clean up, re-testing of pipeline including providing all equipments, manpower & consumables.

7.22 **Magnetic Cleaning, Caliper Pigging**

The individual contractor shall carry out magnetic cleaning and caliper pigging of the pipeline system being installed by him. Contractor shall engage a specialized agency that have previously carried out such operations (magnetic cleaning and caliper pigging) and shall develop procedures, supervise and monitor the entire operations, coordinate with other Contractor(s) as required. Rectification of defects observed during caliper pig run, shall be carried out by the contractor including digging, cutting, replacement, repair, welding, NDT etc.

7.23 **Pre-Commissioning and Commissioning assistance of Pipeline**

Pipeline Contractor shall be responsible for pre-commissioning and commissioning assistance of the pipeline system being installed by him. The above shall include P&ID checks (with respect to requirement of design/ operation/ safety and interlocks of latest revision of P&IDs), flushing, tightness test, de-watering, as required and supply of consumables required during pre-commissioning and commissioning assistance. Contractor shall supply manpower, materials, equipment including consumables along with necessary piping and instrumentation connections for monitoring flow rate, pressure, temperature etc. temporary venting along with necessary piping, valves and instrumentation as well as consumables.

7.24 Commissioning

Contractors shall mobilize all equipment, consumables and manpower for carrying out pigging, drying, inertization and commissioning activities.

Contractors shall engage a specialized team/ agency who have previously carried out such operations and shall develop procedures, supervise and monitor the entire operations, coordinate with other Contractor(s) as required till the time commissioning operations are completed. Contractor shall mobilize all equipment, materials, consumables including pigs, nitrogen and manpower etc. for commissioning activities. All necessary piping connection as required shall be carried out.

Commissioning activities shall be carried out as per applicable specifications enclosed with Contract.

7.25 **Priorities**

COMPANY may, at its sole option, assign priority of construction to any part of the total pipeline or terminal works. Contractor shall comply with such priority of execution without any time and cost implication to the COMPANY.

7.26 **Terminal Piping Works**

The construction work shall be carried out based on Issued for Construction (IFC) drawings issued to Contractor at the time of construction. The final IFC drawings issued during execution stage may vary to some extent from the drawings included in the Bid Package. CONTRACTOR shall carry out all works in accordance with the IFC drawings and reference specifications/ documents with the Contract at no extra cost to the COMPANY.

The piping fabrication, erection, welding, flushing and hydro testing and painting works shall be carried out as per standard piping specifications enclosed with Contract. The hydro test duration shall be minimum 6 hours.

7.27 Working in Areas of Existing Facilities

For pipeline installation work within existing terminal facilities which are under operation, Contractor shall obtain all necessary permissions for working in/ around the facility including hot work permit as applicable and shall be fully responsible for the safety of the existing facilities/ areas during all phases of work and shall fully abide by and comply with the restrictions and conditions of COMPANY/ concerned authorities imposed on Contractor from time to time. Providing all safety appliances, gas detectors required during execution of the work, arranging of adequate fire fighting equipment viz. fire brigade, fire extinguisher, shielding from existing facilities, oxygen mask etc. for carrying out the work safely to the satisfaction of COMPANY shall be done by the Contractor.

Contractor may be permitted to work for limited hours in such places. For working on Sundays/ Holidays, the required permission may be obtained well in advance. During any emergency, work shall be suspended till further permission is obtained by Contractor. Idle period in case of interruption shall not be compensated to Contractor.

The structure/ electric poles/ telegraph poles existing in the vicinity of proposed pipeline shall be properly taken care so that the stability of structure is not affected during construction.

7.28 Conditions for Working in existing ROU

Wherever the contractor has to work in existing ROU, the contractor shall be required to follow all the conditions listed in SOP. The SOP attached in the tender document is tentative. However, detailed approved SOP shall be shared with the CONTRACTOR after award of work. The contractor shall be required to follow all the conditions of SOP at no extra cost to Client. In general, work in existing ROU shall be carried out after taking proper work permit as per extant policies of the existing asset owner. In general, wherever crossing of existing pipeline is to be done, it shall be done as close to 90-degree as possible but in no case less than 45 degree. All safety measures as listed in SOP as well as statutory codes and as per good construction practice shall be followed.

Further, following documents regarding existing ROU shall be made available (to the extent available):

(a) Available Cadastral map of the RoU showing boundary limits in .dwg format

(b) Available As-built pipeline alignment sheets

(c) Sketch layout and .kml files.

(d) RoU Gazette Notification

(e) Any existing documentation available of cross-trenching or dig-site verification to ascertain inter-pipeline distances in multi-pipeline zones

7.29 **Contractor's Responsibilities**

Appraisal and taking cognizance of site-conditions, pipeline route, Central Government/state Govt. rules and regulations/ bye-laws, applicable Indian Standards and Codes, authorities having jurisdiction over the work site(s), environmental and pollution rules and regulations including conditions/ stipulations laid down by the concerned authorities etc. The CONTRACTOR is deemed to have recognized any restrictive features and constraints of the site(s), pipeline route and/ or specific requirements of the work and made due allowance for it in the work to be performed by him. Furnishing and mobilizing at site(s) of all construction equipment, manpower, tools and tackles, construction fronts, fully equipped and fully manned with other required support facilities etc.

An onsite – offsite emergency plan shall be prepared and submitted to Disaster Management Authorities under intimation to respective state authorities.

7.29 **Technical Requirement**

The technical requirements for the pipeline laying as well as terminal works as defined herein shall be read in conjunction with Schedule of Rates, specifications, standards, drawings and other applicable documents enclosed with the Bid document. All piping/pipeline works shall be carried out as per following:

a) Piping and Instrumentation Diagram (P&IDs) and line schedule.
b) Approved for construction Piping General Arrangement Drawing (GADs).
c) Approved for construction Alignment sheets/crossing drawings.
d) Piping Material Specifications.
e) Specifications.
f) Piping support standards/drawings and support index.

8.0 AS BUILT DOCUMENTS

Contractor shall prepare all documents as per the requirements indicated in Specification for Documentation for Pipeline Construction enclosed with the Contract document. In addition to the hard copy, three copies of final documents shall also be submitted in electronic media i.e. Hard disk/ pendrive.
Software used for the presentation of these documents shall be as follows:
Type of document Software

a) Reports -MS Office (Word / Excel)
b) Drawings -AutoCAD

For the purpose of preparation of as-built drawings, Contractor shall update the "Issued for Construction" drawings provided by the Company. For drawings where electronic copies are available for IFC drawings, Contractor shall provide as built drawings in electronic form as well as in hard copies. Where only hard copies are available for IFC drawings, Contractor shall prepare and submit as built drawings in hard copies.

9.0 DOCUMENTS TO BE SUBMITTED AT THE TIME OF BIDDING

No technical documents are required to be submitted at the time of bidding. Bidder is advised to comply with all requirements of Bid document without any deviation. Company reserves the right to reject any bid with deviation without making any reference to the Bidder.

10.0 DOCUMENTS, SPECIFICATION, STANDARDS, DRAWINGS AND ADDITIONAL CLAUSES

10.1 Owner shall furnish piping and Instrumentation diagrams (P & I D), preliminary plot plan along with the tender. Owner shall also supply design & engineering drawings and construction drawings including general arrangement drawings for piping, mechanical & instrumentation systems and other related/ required systems, at appropriate times and as requisitioned by contractor in his time schedule.

10.2 Contractor shall prepare isometric drawings & bill of materials and submit the same for Owner/ Consultant's approval/ record.

Contractor shall prepare drawing for utilities line as required as per SOR and submit the same for Owner/ Consultant's approval/ record.

10.3 No construction small or big shall be carried out without proper construction drawings duly approved by Owner's Engineers at Delhi or site office or Owner's representative duly authorized to do so.

For Mainline, route survey alignment sheets and crossing survey details shall be furnished along with bid by Owner. However, detail-crossing drawings with crossing methodology shall be submitted by Contractor for prior approval. Any additional survey and data required to complete above should be done by Contractor without any extra cost.

10.4 After completion of construction & commissioning of Terminal, Contractor shall incorporate all the correction in drawings, prepare and issue the drawings "As-built drawings" as listed below to Owner as final submission of drawings. For Mainline pipeline alignment sheet, all X-ing details, all CP drawings, pipe book etc. and for Terminals P&ID, layout drg., piping GAD, Isometric, all electrical & instrumentation drg, all civil drawings. For final submission only 4 sets of documents plus the original transparencies shall be handed over by Contractor. Any construction done by Contractor without duly approved drawings shall be wholly at his risk and cost. Contractor shall also submit soft copy of pipe book in excel along with hard copy. Soft copy of all as-built drawings shall be also submitted in AutoCAD. Videography/ photograph of all major activities/ milestone achieved shall also be arranged and submitted by the Contractor. For details of documentation to be submitted for mainline and terminal refer enclosed specification for documentation for pipeline construction Specification No. MEC/S/05/21/69 enclosed elsewhere with the tender.

10.5 **Specifications and Drawings**

The work shall be carried out by CONTRACTOR strictly in accordance with the specifications and drawings enclosed in **Volume II/ III** of this bid document.

10.6 Following amendments to Specifications shall be taken into account:

10.6.1 SPECIFICATION **FOR FIELD JOINT COATING**
(Onshore Pipelines – Specification No: MEC/S/05/21/13, R-0)

Sl. No.	Clause No.	Amendment
1.	3.3.2 (b) – Functional Properties of field joint coating system	Peel Strength-To Pipe surface and to factory coating at T_{max}.(N/mm) shall be read as 1.0 N/mm instead of 0.3 N/mm.
2.	4.2.3--- Application of heat shrink wrap around sleeve	Upon pre-heating the pipe surface shall be applied with two pack epoxy primer of wet film thickness 200 microns or as per manufacturer's recommendation…… Once per shift.

10.6.2 **SPECIFICATION FOR CASING INSULATORS AND END SEALS**
(Specification No: MEC/S/05/62/12, R-0)

1. Clause No. 3.0 (Design- 1st para) shall be read as:

   "Casing insulator shall be made of HDPE, modular type, offering a high impact strength and low coefficient of friction. Each casing insulator element shall represent a flexible section containing a toothed male butt strap at one end and an appropriately toothed female slot on the other end. No metallic parts or attachments should be considered in the casing insulator element assembly. The design of casing insulator should allow for onsite adjustments for any variances within the allowable O.D. range of pipeline and should grip the pipe firmly without any chances of horizontal movement or breakage of the insulator rings during installation. The insulator rings should be fastened onto the carrier pipe with the appropriate tool to be provided by the casing insulator manufacturer."

2. Clause No.4.0 (Material) shall be read as:

   The Casing insulator Material should meet the following specifications:

Description	Value	Standard
Yield strength	>22 N/mm^2	UNI EN ISO 527-2
Tensile strength	>16 N/mm^2	UNI EN ISO 527-2
Elongation at break	>400%	UNI EN ISO 527-2
Hardness shore D	64	ASTM D 2240
Dielectric strength	>37 kV/mm	
UVL stabilization	good	
MVTR (Moisture Vapor Transmission Rate)	very low	
Density @ 23°C	960 kg/m^3	ISO 1183/A
Melting point	136°C	ISO 11357-3

In case of any conflict between the requirements for casing insulator as mentioned above and technical specification enclosed elsewhere in the bid document, the requirements mentioned above shall supersede.

10.6.3 **SPECIFICATION FOR WELDING OF ONSHORE GAS PIPELINES**

(Specification No: MEC/S/05/21/02), **ANNEXURE-VIII**, Sheet 1 of 1

COMPARISON OF FILMS FROM DIFFERENT MANUFACTURERS shall be read as:

CEN Classification	KODAK	AGFA	FUJI
---	CX	D8	---
C5	AA400	D7	IX 100
C4	T200	D7	IX80
C3	MX125	D4	IX50
C2	M100	D3	---
CI	DR50	D2	IX25
---	SR**	---	---

**- *Special films, extremely fine grain and very high resolution*

Note: For X-Ray, Agfa D7 or equivalent film shall be used.
For Gamma Ray, Agfa D4 or equivalent film shall be used.
For computed radiography, imaging plates having equivalent image resolution and quality shall be used.

10.6.4 **SPECIFICATION FOR PRE-COMMISSIONING & COMMISSIONING**
(Specification No: MEC/05/28/M/000/1093), Clause NO.: 2.2, i.e., "Drying, Inertization, Gas-in / Commissioning, Stabilization & 72 hours run.

Drying is acceptable if all the following conditions are achieved and verified:

- Achievement of outlet dew point of (-) 20°C at atmospheric pressure.
- Performance for soak test for a minimum of 24 hours
- No significant variance of the outlet dew point (by more than 3° C) after pipeline volume is
  replaced after soak test

10.7 ADDITIONAL CLAUSES

10.7.1 Contractor to note that the minimum requirements of inspection and testing of the bought-out items shall be governed by attached QAP with the tender document. However, contractor shall submit their QAP in line with the requirement specified in attached QAP for Owner's/ PMC's approval.

10.7.2 Contractor to note that all the documents/drawings submitted by them as a part of bid shall be considered only to assess Bidder's technical capability and shall in no way absolve them from complying with all the requirements of the Tender. All works to be performed by the Bidder shall be strictly in accordance with tender conditions.

10.7.3 Contractor shall submit duly signed & stamped hard copies of all required documents/ drawings/ data sheets etc. to MECON for their review & approval as per terms & condition of tender documents. The date of receipt of these documents/ drawings/ data sheets etc. at MECON shall be deemed as the date of submission. If any documents/ drawings/ data sheets etc. require re-submission due to any error/ deficiency noticed during review/ approval stage, in that event the additional time required by the contractor to get the revised document/ drawing reviewed/approved by MECON shall be solely to contractor's account and in no case, contractor shall be entitled for any time or cost benefit.

10.7.4 The drawings/ documents/ data sheets etc. shall be reviewed, checked, approved and duly signed/stamped by successful contractor before submission. Revision number

shall be changed and revisions shall be highlighted by clouds during submission of revised documents/ drawings/ data sheets by the successful contractor. Whenever the successful contractor requires any sub-supplier drawings to be reviewed/ approved by MECON, the same shall be submitted by the contractor after review/ approval and stamped by the Contractor. Direct submission of the sub-supplier's drawings/documents/data sheets etc. without contractor's approval shall not be entertained.

10.7.5 Review/ Approval of the contractor's submitted drawings/ documents/ data sheets etc. by MECON would be only to review the compatibility with basic design and concepts including mainline work procedure and in no way absolve the successful contractor of his responsibility/contractual obligation to comply with tender requirements, applicable codes, specifications and statutory rules/regulations. Any error/ deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the contractor without any extra cost or time, whether or not comments on the same were received from MECON during the drawing review stage.

10.7.6 Contractor shall make & maintain their own suitable sized Storage yard/ area (covered as well as open space) to store Free Issue Materials (FIM) in proper manner. Contractor shall also maintain the FIM in good condition during entire storage period by using all type of servicing/overhauling such as cleaning, greasing, protecting from rusting/ pitting etc.

Storage Yard/ Area shall have proper motorable approach, adequate indoor & outdoor area lighting, potable & service water, proper rack & wooden sleeper etc. for staking/ storing the material, availability of material handling equipment of adequate capacity etc.

Owner/ PMC's Site In-charge shall visit & inspect the Contractor's Storage Yard/ Area and upon his concurrence only, the FIM shall be stored by the Contractor at the particular Storage Yard/ Area.

Delay in issuance of FIM due to non-acceptance of Contractor's Storage Yard/ Area (i.e., mainly because of non-compliance of the minimum condition as mentioned above for Storage Yard/ Area) shall not be attributable to Owner/ PMC.

10.7.7 During construction, Owner / PMC, on their discretion, have reserve right to take samples for any bought-out item received at site and test the same in a NABL approved or equivalent laboratory even if the lot has already been inspected and cleared by PMC/ Owner for use in construction. The cost for such testing shall be borne by the Contractor. In case of failure of the samples, the lot shall be rejected and the same shall be replaced by the Contractor without any additional cost to Owner.

11.0 INDICATIVE CONSTRUCTION MILESTONE

(Appendix-I to Particular Job Specification of Work)

DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S IGGL

INDICATIVE CONSTRUCTION MILESTONE FOR PIPELINE LAYING, TERMINAL & ASSOCIATED WORKS

ZERO DATE

Sl. No.	Activity Description	Duration (in Months)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	AWARD OF CONTRACT																			
1	MOBILIZATION	1.00																		
2	TAKING/HANDING OVER ROU (DATE OF PANCHNAMA), CLEANING AND GRADING	10.00																		
3	LIFTING OF COATED PIPES FROM COATING YARD AND STRINGING	10.25																		
4	FIT-UP,WELDING,NDT	10.50																		
5	JOINT-COATING, TRENCHING, LOWERING & BACKFILLING	12.00					↓25%			↓50%			↓75%			↓100%				
6	TIE-IN, INCLUDING CROSSINGS, HYDROTESTING & DEWATERING (MAINLINE)	10.50																		
7	COMPLETE CIVIL WORKS (INCLUDING STRUCTURAL & ARCHITECTURAL WORKS) FOR ALL SV STATIONS; CIVIL WORKS PERTAINING TO PROCESS AREA OF DT & RT	10.00																		
8	INSTRUMENTATION, TELECOM, ELECTRICAL & FIRE PROTECTION WORKS	4.00																		
9	SCRAPPER TRAP INSTALLATION, MECHANICAL WORKS, SWABBING, EGP, SV , GOLDEN TIE-IN, RE-STORATION & PRE-COMMISSIONING	9.00																		
10	DRYING AND COMMISSIONING	3.00																		

Note:-

1. The schedule of station work e.g. mechanical, civil (including structural & architectural), electrical, telecom, Instrumentation and fire protection system works shall be in line with the schedule indicated above meeting the schedule requirement for mechanical completion and commissioning, as mentioned in bid document.

2. Commissioning shall include testing & commissioning of all associated works

ASKING RATE UPTO LOWERING------25 Km/ Month

12.0 DATA SHEETS FOR MECHANICAL ITEMS ETC.

(Appendix-II to Particular Job Specification of Work)

DATA SHEETS FOR MECHANICAL ITEMS

CONTENTS

I. Valves (Ball valves, plug Valves, globe valves, Check Valves)
II. Insulating Joints
III. Scrapper Trap
IV. Pig Signaler (Non-intrusive type)
V. Pressure Safety Valves (PSV)
VI. LR Bends
VII. Flame Arrestor
VIII. Restricted Orifice Plate
IX. Split Tee
X. Mud Mats

DATA SHEET FOR MANUAL BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch) : ¾ " ANSI RATING : 600# Design Standard **: BS EN ISO 17292**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 20 (3/4")
	Material :	ASTM A 106 Gr B
5.1	Diameter (OD)	26.7mm
5.2	Thickness	S 160

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]
b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Floating Ball Type

6.5 Valve body type : Fully Welded [ ] Two/Three Piece Bolted Body [√] Either [ ]
Socket welded as per ASME B 16.11
100mm Extension Pups of ASME A 106 GR.B Sch 160 [√]

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**ASTM A105**	
7.2	Ball	**13% Cr Steel**	
7.3	Body Seat	**As per fire-safe certificate**	
7.4	Gland	**13% Cr Steel**	
7.5	Stem (No Casting)	**13% Cr Steel**	
7.6	Stem Seal	**As per fire-safe certificate**	
7.7	Body Studs/Nuts	**ASTM A193 Gr. B7/ A194 Gr. 2H**	

8.0	Corrosion Allowance	:3.0 **mm**		Service : Natural Gas	
9.0	Location	: Above Ground	√	Buried	
10.0	Stem Extension Requirement	: Yes		No	√
11.0	Lever Operator Requirement	: Yes	√	No	
12.0	Actuator Requirement	: Yes		No	√

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration, minutes
14.1	Hydrostatic Test	Body	**157**	**BS EN ISO 17292**
		Seat	**114**	**BS EN ISO 17292**
14.2	Air Test		**5.6 - 7**	**BS EN ISO 17292**

15.0 Anti-Static Testing Requirement :**As per BS EN ISO 17292**

16.0 Valve Painting Specification

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open/ Lock Close/Normally Close Requirement : **NA**

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1

2 Minimum thickness of valve body / adapter shall not be less than that specified in BS 17292 plus corrosion allowance specified in this datasheet .

3 Charpy V-notch test for body, ball, body seat, gland, stem & studs/nuts shall be conducted as per A370. The test shall be conducted at 0°C. The minimum average absorbed energy per set of three specimen shall be 27 J with an individual minimum per specimen of 22 J.

4 Material test certificates and hydrostatic test reports shall be furnished prior to despatch.

5 Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves.

6 All tests shall be as per Approved QAP.

7 Valves shall have ball position indicator.

8 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.

9 Each valve shall be provided with a wrench.

10 Valves shall be inspected and approved by Purchaser before dispatch.

11 Gland packing assembly shall permit repair of gland packing under full line pressure.

12 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas				CLIENT : IGGL	
	PREPARED	CHECKED	APPROVED		
NAME	Vikash	Ashish M	Harsh K		
DATE	02.07.2026	02.07.2026	02.07.2026	PROJECT:	Duliajan Feeder Line
SIGN					

MECON LIMITED

DATA SHEET FOR BALL VALVES (NB < 2" D1A)	SCALE : DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/01	REV 0

DATA SHEET FOR FLANGED END MANUAL BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch): 2" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure **: 92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting Pipe Specification: **N.A.**

5.1 Material

5.2 Diameter (OD)

5.3 Thickness

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [√] Butt Welded as per ASME B16.25 [ ]

6.3. Flanges (wherever applicable) : a) RF [√] RT [ ] NA [ ]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [√] NA [ ]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [ ] Two/Three Piece Bolted Body [√] Either [ ]

6.6 500 mm pup piece (integrally welded to the valve on each side) : Yes [ ] No [√]
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement : Yes [ ] Lever/Wrench [√] Lever Operated for 2"

12.0 Actuator Requirement : Yes [ ] No [√]

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3. Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8. For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
11. Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/02

REV 0

DATA SHEET FOR FLANGED END MANUAL BALL VALVES

1.0 Valve manufacturer :

2.0 Valve Size (NB) (inch): 4", 8" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting Pipe Specification: **N.A.**

5.1 Material

5.2 Diameter (OD)

5.3 Thickness

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [√] Full Bore [ ]

6.2. End Connections : Flanged as per ASME B16.5 [√] Butt Welded as per ASME B16.25 [ ]

6.3. Flanges (wherever applicable) : a) RF [√] RT [ ] NA [ ]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [√] NA [ ]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [ ] Two/Three Piece Bolted Body [√] Either [ ]

6.6 500 mm pup piece (integrally welded to the valve on each side) : Yes [ ] No [√]
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating/**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement : Yes [√] Lever/Wrench [ ] For 4" & 8" Gear Operator with hand wheel

12.0 Actuator Requirement : Yes [ ] No [√]

13.0 Fire Resistant Design Requirement : **Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A.**

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2 Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8 For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9 Valves shall be inspected and approved by Purchaser before despatch.
10 Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12 For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13 For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14 All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15 Gearbox design/selection shall be based on the maximum torque value at stem
16 Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17 Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/03

DATA SHEET FOR WELDED END MANUAL BALL VALVES

1.0 Valve Manufacturer:

2.0 Valve Size (NB) (inch): 4", 8" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

		DN 100 (4")	DN 200 (8")
5.0	Connecting Pipe Specification:		
5.1	Material	ASTM A 106 GR.B (Charpy)	API 5L GR.B PSL 2
5.2	Diameter (OD)	114.3 mm	219.07
5.3	Thickness	XS	14.3mm

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [√] Full Bore [ ]

6.2. End Connections : Flanged as per ASME B16.5 [ ] Butt Welded as per ASME B16.25 [√]

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [√] Two/Three Piece Bolted Body Either [ ]

6.6 pup piece (integrally welded to the valve on each side) : For 4 "(200mm) & For 8" (300mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement [√] Lever/Wrench [ ] For 4" & 8" Gear operator with hand wheel

12.0 Actuator Requirement : Yes [ ] No [√]

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A.**

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2 Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8 For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9 Valves shall be inspected and approved by Purchaser before despatch.
10 Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12 For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13 For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14 All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15 Gearbox design/selection shall be based on the maximum torque value at stem
16 Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17 Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/04

DATA SHEET FOR WELDED END MANUAL BALL VALVES

1.0 Schedule No :

2.0 Valve Size (NB) (inch): 4" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 100 (4")
5.1	Material	ASTM A 106 GR.B (Charpy)
5.2	Diameter (OD)	114.3 mm
5.3	Thickness	XS

6.0 **Valve Construction Design**

6.1.	Configuration	: Reduced Bore		Full Bore	√		
6.2.	End Connections	: Flanged as per ASME B16.5		Butt Welded as per ASME B16.25		√	
6.3.	Flanges (wherever applicable)	: a) RF		RT		NA	
		b) Serrated		Smooth (125 to 200 microinches AARH)		NA	
6.4	Ball Mounting	: Trunnion mounted					
6.5	Valve body type	: Fully Welded	√	Two/Three Piece Bolted Body		Either	

6.6 pup piece (integrally welded to the valve on each side) : For 4" (200mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0	Corrosion Allowance	:**3.0 mm**		Service : Natural Gas		
9.0	Location	: Above Ground	√	Buried		
10.0	Stem Extension Requirement	: Yes		No	√	
11.0	Gear Operator Requirement	: Yes	√	Lever/Wrench		For 4" Gear Operator With Hand wheel
12.0	Actuator Requirement	: Yes		No	√	

13.0 Fire Resistant Design Requirement : **Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **YES** (As Per SOR)

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2 Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8 For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9 Valves shall be inspected and approved by Purchaser before despatch.
10 Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12 For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13 For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14 All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15 Gearbox design/selection shall be based on the maximum torque value at stem
16 Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17 Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

MECON LIMITED

PROJECT: Duliajan Feeder Line

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/05

DATA SHEET FOR WELDED END EXTENDED STEM MANUAL BALL VALVES

1.0 Valve Manufcaturer :

2.0 Valve Size (NB) (inch): 8" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 200 (8")
5.1	Material	API 5L GR.B PSL 2
5.2	Diameter (OD)	219.07
5.3	Thickness	14.3mm

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [√] Full Bore [ ]

6.2. End Connections : Flanged as per ASME B16.5 [ ] Butt Welded as per ASME B16.25 [√]

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [√] Two/Three Piece Bolted Body [ ] Either [ ]

6.6 pup piece (integrally welded to the valve on each side) : For 8" (300mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : Natural Gas

9.0 Location :Above Ground [ ] Buried [√] Length of extended stem shall be 2750±250 which shall be finalized during drawing approval stage.

10.0 Stem Extension Requirement : Yes [√] No [ ]

11.0 Gear Operator Requirement [√] Lever/Wrench [ ] For 8" Gear Operator with handwheel

12.0 Actuator Requirement : Yes [ ] No [√]

13.0 Fire Resistant Design Requirement : **Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 600 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A.**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3. Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8. For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12. For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13. For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14. All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15. Gearbox design/selection shall be based on the maximum torque value at stem
16. Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17. Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/06

DATA SHEET FOR WELDED END MANUAL BALL VALVES

1.0 Valva Manufacturer :

2.0 Valve Size (NB) (inch): 12" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 300 (12")
5.1	Material	API 5L GR X-52 PSL 2
5.2	Diameter (OD)	323.9mm
5.3	Thickness	S60

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [ ] Butt Welded as per ASME B16.25 [√]

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [√] Two/Three Piece Bolted Body Either [ ]

6.6 pup piece (integrally welded to the valve on each side) : For 12" (300mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement [√] Lever/Wrench [ ] For 12" Gear Operator with hand wheel

12.0 Actuator Requirement : Yes [ ] No [√]

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A.**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3. Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8. For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12. For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13. For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14. All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15. Gearbox design/selection shall be based on the maximum torque value at stem
16. Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17. Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/07

DATA SHEET FOR FLANGED END HYDRAULIC OPERTED BALL VALVES

1.0 Valve Manuafcturer :

2.0 Valve Size (NB) (inch): 24" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting Pipe Specification: **N.A.**

5.1 Material

5.2 Diameter (OD)

5.3 Thickness

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [√] Butt Welded as per ASME B16.25 [ ]

6.3. Flanges (wherever applicable) : a) RF [√] RT [ ] NA [ ]
b) Serrated [ ] Smooth (125 to 200 microinches AARH) [√] NA [ ]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [ ] Two/Three Piece Bolted Body [√] Either [ ]

6.6 500 mm pup piece (integrally welded to the valve on each side) : Yes [ ] No [√]
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0mm** Service :Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement : Yes [ ] Lever/Wrench [ ]

12.0 Actuator Requirement : Yes [√] No [ ] HOV as per TS & Datasheet of Actuator

13.0 Fire Resistant Design Requirement : **Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **NA**

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2 Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8 For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9 Valves shall be inspected and approved by Purchaser before despatch.
10 Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12 For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13 For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14 All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15 Gearbox design/selection shall be based on the maximum torque value at stem
16 Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17 Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/08

DATA SHEET FOR WELDED END HYDRAULIC OPERTED BALL VALVES

1.0 Valve Manufcaturer :

2.0 Valve Size (NB) (inch): 24" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 600 (24")
5.1	Material	API 5L Gr X-70
5.2	Diameter (OD)	610 mm
5.3	Thickness	12.7mm

6.0 **Valve Construction Design**

6.1.	Configuration	: Reduced Bore		Full Bore	√		
6.2.	End Connections	: Flanged as per ASME B16.5		Butt Welded as per ASME B16.25		√	
6.3.	Flanges (wherever applicable)	: a) RF		RT		NA	√
		b) Serrated		Smooth (125 to 200 microinches AARH)		NA	√
6.4	Ball Mounting	: Trunnion mounted					
6.5	Valve body type	: Fully Welded	√	Two/Three Piece Bolted Body		Either	

6.6 pup piece (integrally welded to the valve on each side) **:** For 24 " (600mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0	Corrosion Allowance	: **3.0 mm**		Service :Natural Gas		
9.0	Location	: Above Ground	√	Buried		
10.0	Stem Extension Requirement	: Yes		No	√	HOV As per TS & Datasheet
11.0	Gear Operator Requirement			Lever/Wrench		
12.0	Actuator Requirement	: Yes	√	No		

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A.**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3. Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8. For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12. For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13. For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14. All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15. Gearbox design/selection shall be based on the maximum torque value at stem
16. Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17. Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas					
	PREPARED	CHECKED	APPROVED		
NAME	Vikash	AM	HK	CLIENT : IGGL	
DATE	02.07.2026	02.07.2026	02.07.2026		
SIGN				PROJECT: Duliajan Feeder Line	

MECON LIMITED

SCALE : REV

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/09 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET FOR BUTT WELD END REMOTE OPERTED GOV BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch) : 600 (24") ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 600 (24")
5.1	Material	API 5L Gr. X-70
5.2	Diameter (OD)	610 mm
5.3	Thickness	12.7mm

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [ ] Butt Welded as per ASME B16.25 [√]

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [√]

6.6 pup piece (integrally welded to the valve on each side) **:** For 24" (600mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB**	
7.2	Ball	**A 216 Gr.WCB +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Fire Safe Certificate of valve manufacturer**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Fire Safe Certificate of valve manufacturer**	
7.7	Trunnion	**A 216 Gr. WCB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : **Natural Gas**

9.0 Stem extension : NA

10.0 Actuator Requirement : : **YES** **Remote Operated Gas Over Oil Actuated as per Actuator's TS & DS**

11.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607** **Auto-Closure (Qty as per SOR)**

12.0 **Valve Testing Requirement**

			Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
12.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
12.2	Air Test		**5.6 - 7**	**2X As per API 6D**

13.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

14.0 **Valve Painting Specification**

14.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

14.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

15.0 Lock Open Requirement : **NA**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than as per ASME B16.34 + 1.5 mm CA
3. Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8. For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12. Valve seat design shall conform to DIB-1 design .
13. For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14. All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15. Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
16. Gearbox design/selection shall be based on the maximum torque value at stem
17. Valves shall be provided with API 6D Monogram.
18. For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2")

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/10

DATA SHEET FOR FIANGED END REMOTE OPERTED GOV BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch) : 600 (24") ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting Pipe Specification:

5.1 Material

5.2 Diameter (OD)

5.3 Thickness

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [√] Butt Welded as per ASME B16.25 [ ]

6.3. Flanges (wherever applicable) : a) RF [√] RT [ ] NA [√]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Two/Three piece bolted body

6.6 500 mm pup piece (integrally welded to the valve on each side) : Yes [ ] No [√]

(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB**	
7.2	Ball	**A 216 Gr.WCB +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Fire Safe Certificate of valve manufacturer**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Fire Safe Certificate of valve manufacturer**	
7.7	Trunnion	**A 216 Gr. WCB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : **Natural Gas**

9.0 Stem extension : NA

10.0 Actuator Requirement : : **YES** **Remote Operated Gas Over Oil Actuated as per Actuator's TS & DS**

11.0 Fire Resistant Design Requirement : **Type test as per API 6 FA/607**

12.0 **Valve Testing Requirement**

			Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
12.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
12.2	Air Test		**5.6 - 7**	**2X As per API 6D**

13.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

14.0 **Valve Painting Specification**

14.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

14.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

15.0 Lock Open Requirement : **NA**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than as per ASME B16.34 + 1.5 mm CA
3. Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8. For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12. Valve seat design shall conform to DIB-1 design .
13. For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14. All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15. Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
16. Gearbox design/selection shall be based on the maximum torque value at stem
17. Valves shall be provided with API 6D Monogram.
18. For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

DATA SHEET FOR BALL VALVES (NB ≥ 2")

MECON LIMITED

SCALE :

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/11

REV 0

DATA SHEET FOR FLANGED END REMOTE OPERTED GOV BALL VALVES

1.0 Valve manufacturer:

2.0 Valve Size (NB) (inch): 8" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting Pipe Specification: **N.A.**

5.1 Material

5.2 Diameter (OD)

5.3 Thickness

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [√] Full Bore [ ]

6.2. End Connections : Flanged as per ASME B16.5 [√] Butt Welded as per ASME B16.25 [ ]

6.3. Flanges (wherever applicable) : a) RF [√] RT [ ] NA [ ]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [√] NA [ ]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [ ] Two/Three Piece Bolted Body [√] Either [ ]

6.6 500 mm pup piece (integrally welded to the valve on each side) : Yes [ ] No [√]
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating/**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance **3.0 mm** Service : Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement : Yes [ ] Lever/Wrench [ ]

12.0 Actuator Requirement : Yes [√] No [ ]

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607** **Remote Operated Gas Over Oil Actuated as per Actuator's TS & DS**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A.**

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2 Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.
3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8 For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**
9 Valves shall be inspected and approved by Purchaser before despatch.
10 Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12 For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.
13 For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14 All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15 Gearbox design/selection shall be based on the maximum torque value at stem
16 Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
17 Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/12

DATA SHEET FOR BUTT WELD END EXTENDED STEM REMOTE OPERTED GOV BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch) : 600 (24") ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 600 (24")
5.1	Material	API 5L Gr. X-70
5.2	Diameter (OD)	610 mm
5.3	Thickness	12.7mm

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [ ] Butt Welded as per ASME B16.25 [√]

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [√]

6.6 Pup piece (integrally welded to the valve on each side) : For 24" (600mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB**	
7.2	Ball	**A 216 Gr.WCB +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Fire Safe Certificate of valve manufacturer**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Fire Safe Certificate of valve manufacturer**	
7.7	Trunnion	**A 216 Gr. WCB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : **Natural Gas** Length of extended stem shall be 2750±250 which shall be finalized during drawing approval stage.

9.0 Stem extension : **YES**

10.0 Actuator Requirement : : **YES**

11.0 Fire Resistant Design Requirement : **Type test as per API 6 FA/607** **Remote Operated Gas Over Oil Actuated as per Actuator's TS & DS**

12.0 **Valve Testing Requirement** **Auto-Closure (Qty as per SOR)**

			Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
12.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
12.2	Air Test		**5.6 - 7**	**2X As per API 6D**

13.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

14.0 **Valve Painting Specification**

14.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

14.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 600 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

15.0 Lock Open Requirement : **NA**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than as per ASME B16.34 + 1.5 mm CA
3. Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
4. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
5. Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.
6. Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.
7. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
8. For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
9. Valves shall be inspected and approved by Purchaser before despatch.
10. Support foot & lifting lugs shall be provided as per Cl. 4.16 of the TS for Ball Valves.
11. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
12. Valve seat design shall conform to DIB-1 design .
13. For DIB-1, the inlet of PRV shall be provided with needle valve and the outlet of PRV shall be connected to body of the valve through a non-return valve
14. All trunnion mounted valve shall be provided with seat and stem sealant injection facility consisting needle valve, NRV and grease fitting.
15. Threaded connections are not permitted for sealant / vent/ drain / PRV / tubing etc
16. Gearbox design/selection shall be based on the maximum torque value at stem
17. Valves shall be provided with API 6D Monogram.
18. For trunnion-mounted valve:- valve design is having DIB-1 arrangement as per API-6D and is fitted with external cavity relief system discharging to one side of valve body.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB ≥ 2")

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/13

DATA SHEET FOR LOW TEMPERATRE BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch) : 3/4" ANSI RATING : 600# Design Standard : **ISO 17292**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-46°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 20 (3/4")
5.1	Material	ASTM A106 Gr.B
5.2	Diameter (OD)	26.7 mm
5.3	Thickness	S160

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2 End Connections **: Socket Welded as per ASME B16.11** [√]
100 mm Extension Pups of ASTM A333 Gr.6 (Sch. 160 for 3/4") at both ends

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] [ ] NA [√]
b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : **Floating Ball type**

6.5 Valve body type : Bolted body

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**ASTM A350 Gr. LF2**	
7.2	Ball	**(SS316 /ASTM A350 Gr. LF2)+ 75µENP coating**	
7.3	Body Seat	**As per Fire Safe Certificate of valve manufacturer**	
7.4	Gland	**SS316**	
7.5	Stem (No Casting)	**SS316 (No Casting) /ASTM A350 Gr. LF2**	
7.6	Body Seal	**As per Fire Safe Certificate of valve manufacturer**	
7.7	Stem Seal	**As per Fire Safe Certificate of valve manufacturer**	
7.8	Body Studs/Nuts	**ASTM A320 Gr.L7/ ASTM A194 Gr.4**	

8.0 Corrosion Allowance : **3.0 mm** Service : **Natural Gas**

9.0 Stem extension : NA

10.0 Operator : Lever operated

11.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

12.0 **Valve Testing Requirement**

			Test Pressure (min.), kg/cm^2(g)	Minimum Duration (minutes)
12.1	Hydrostatic Test	Body	**157**	**As per ISO 17292**
		Seat	**114**	**As per ISO 17292**
12.2	Air Test		**5.6 - 7**	**As per ISO 17292**

13.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

14.0 **Valve Painting Specification**

14.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900

14.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

15.0 Lock Open Requirement : **N.A.**

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1
2. Minimum thickness of valve body / adapter shall not be less than that specified in ISO 17292 plus 1.5 mm corrosion allowance specified in this datasheet .
3. Charpy V-notch test for body, ball, body seat, gland, stem & studs/nuts shall be conducted as per A370. The test shall be conducted at -46°C. The minimum average absorbed energy per set of three specimen shall be 27 J with an individual minimum per specimen of 22 J.
4. Material test certificates and hydrostatic test reports shall be furnished prior to despatch.
5. Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves. prior to manufacture of the valves.
6. All tests shall be as per BS EN 12266.
7. Valves shall have ball position indicator.
8. Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.
9. Each valve shall be provided with a wrench.
10. Valves shall be inspected and approved by Purchaser before dispatch.
11. Gland packing assembly shall permit repair of gland packing under full line pressure.
12. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

REV 0

DATA SHEET FOR BALL VALVES (NB < 2")

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/14

DATA SHEET FOR WELDED END MANUAL BALL VALVES

1.0 Valve manufacturer :

2.0 Valve Size (NB) (inch): 2" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0	Connecting Pipe Specification:	DN 50 (2")
5.1	Material	ASTM A 106 GR.B (CHARPY)
5.2	Diameter (OD)	60.32
5.3	Thickness	S80

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [ ] Butt Welded as per ASME B16.25 [√]

6.3. Flanges (wherever applicable) : a) RF [ ] RT [ ] NA [√]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [ ] NA [√]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [√] Two/Three Piece Bolted Body [ ] Either [ ]

6.6 Pup piece (integrally welded to the valve on each side) : For 2" (200mm)
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement [ ] Lever/Wrench [√]

12.0 Actuator Requirement : Yes [ ] No [√]

13.0 Fire Resistant Design Requirement **: Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **N.A.**

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1

2 Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.

3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.

4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.

5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.

6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.

7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.

8 For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**

9 Valves shall be inspected and approved by Purchaser before despatch.

10 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".

11 Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

MECON LIMITED

PROJECT: Duliajan Feeder Line

SCALE :

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/15

REV 0

DATA SHEET FOR FLANGED END MANUAL BALL VALVES

1.0 Valve Manufacturer :

2.0 Valve Size (NB) (inch): 2" ANSI RATING : 600# Design Standard : **API 6D**

3.0 MECON's Technical Specification No.: **MEC/TS/05/21/002, Rev-1, Ed-1**

4.0 Design Pressure : **92 kg/cm2 (g)** Design Temperature, °C : **-29°C to + 65°C**

5.0 Connecting Pipe Specification: **N.A.**

5.1 Material

5.2 Diameter (OD)

5.3 Thickness

6.0 **Valve Construction Design**

6.1. Configuration : Reduced Bore [ ] Full Bore [√]

6.2. End Connections : Flanged as per ASME B16.5 [√] Butt Welded as per ASME B16.25 [ ]

6.3. Flanges (wherever applicable) : a) RF [√] RT [ ] NA [ ]

b) Serrated [ ] Smooth (125 to 200 microinches AARH) [√] NA [ ]

6.4 Ball Mounting : Trunnion mounted

6.5 Valve body type : Fully Welded [ ] Two/Three Piece Bolted Body [√] Either [ ]

6.6 500 mm pup piece (integrally welded to the valve on each side) : Yes [ ] No [√]
(Material,Outer Diameter and Thickness of pup piece to be same as that of the connecting pipe mentioned above)

7.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or superior)
7.1	Body	**A 216 Gr. WCB / A 234 Gr. WPB**	
7.2	Ball	**(A 216 Gr.WCB/A 234 Gr.WPB) +75 µENP coating**	
7.3	Body Seat Rings (No Casting)	**AISI 4140 + 75 micron ENP coating**	
7.4	Seat Seal	**As per Firesafe Certificate**	
7.5	Stem (No casting)	**AISI 4140 + 75 micron ENP coating**	
7.6	Stem Seals	**As per Firesafe Certificate**	
7.7	Trunnion	**A 216 Gr. WCB/A 234 Gr. WPB**	
7.8	Stud Bolts/ Nuts	**ASTM A 193 Gr. B7/ A194 Gr. 2H**	

8.0 Corrosion Allowance : **3.0 mm** Service : Natural Gas

9.0 Location : Above Ground [√] Buried [ ]

10.0 Stem Extension Requirement : Yes [ ] No [√]

11.0 Gear Operator Requirement : Yes [ ] Lever/Wrench [√]

12.0 Actuator Requirement : Yes [ ] No [√]

13.0 Fire Resistant Design Requirement : **Type test as per API 6 FA/607**

14.0 **Valve Testing Requirement**

			Test Pressure (min.), $kg/cm^2(g)$	Minimum Duration (minutes)
14.1	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
14.2	Air Test		**5.6 - 7**	**2X As per API 6D**

15.0 Anti-Static Testing Requirement : **As per Standard API 6D (Latest Ed.)**

16.0 **Valve Painting Specification**

16.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

16.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

17.0 Lock Open Requirement : **YES** (As Per SOR)

Notes:

1 This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/21/002,Rev 1 ,Ed. 1

2 Minimum thickness of valve body / adapter shall not be less than that specified in ASME B 16.34 plus corrosion allowance.

3 Inspection and Testing shall be as per approved QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.

4 Stops shall be provided for positive alignment of ball with ports and ensure proper installation of handle.

5 Short pattern valves (as per API 6D or otherwise) are not permitted. Only long pattern valves are to be supplied.

6 Charpy V-notch & Hardness test for body, body adaptor, end flanges, ball, body seat rings, stem & studs / nuts shall be conducted as per Cl. 3.4 & 3.6 of TS respectively or as per relevant material code.

7 Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.

8 For welding end, the out of roundness (i.e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.**NA**

9 Valves shall be inspected and approved by Purchaser before despatch.

10 Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".

11 Valves shall be provided with API 6D Monogram.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

SCALE :

DATA SHEET FOR BALL VALVES (NB ≥ 2" , D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/BV/16

REV 0

DATA SHEET FOR LTCS PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size DN (inch): DN200 (8"), DN 50 (2") ANSI Rating : 600# Design Standard : API 6D

3.0 MECON's Technical Specification No.: MEC/TS/05/62/003, Rev-2

4.0 Connecting Pipeline Design Pressure: 92 Kg/cm2(g) Design Temperature, °C : -29°C to 65°C

5.0 **Connecting Pipe Specification**

5.1 Material :

5.2 Diameter (OD), mm :

5.3 Thickness (mm) / Schedule :

6.0 **Valve Construction Design**

6.1.	Pattern	:	Short		Regular	√	Venturi
6.2.	End Connections	:	Flanged both ends			√	Flanged as per ASME B 16.5
		:	Butt Weld both ends				Butt Weld as per ASME B16.25
		:	Flanged one end, butt weld other end				
		:	Socket weld both ends				Socket Weld as per ASME B16.11

6.3. Flanges : a) RF √ FF RTJ NA

b) Serrated Smooth (125 to 200 microinches AARH) √ NA

7.0 **Valve Material Specification**

	Part	Material	Material Offered (Equivalent or Superior)
7.1	Body	A 352 Gr.LCB/ A350 Gr.LF2	
7.2	Plug	(SS316 /A 352 Gr.LCB/ A 350 Gr.LF2) with 75microns ENP Coating	
7.3	Cover	A 352 Gr.LCB/ A350 Gr.LF2	
7.4	Stem	SS 316 (No casting) / A350 Gr. LF2	
7.5	Stem Seal	As per Fire safe Certificate	
7.6	Stud Bolts/ Nuts	ASTM A320 Gr.L7/ ASTM A194.Gr.4	

8.0 Corrosion Allowance : **3.0 mm** Service : **Natural Gas**

9.0	Location	:	Above Ground √	Buried		
10.0	Stem Extension Requirement	:	Yes	No √		
11.0	Gear Operator Requirement	:	Yes √	No		For 8" Gear operted with Hand wheel
12.0	Actuator Requirement	:	Yes	No √		

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ API 607**

14.0 **Valve Testing Requirement**

	Hydrostatic Test	Min. Test Pressure kg/cm2(g)	Minimum Duration, minutes
14.1	Body	**157**	**2X As per API 6D**
	Seat	**114**	**2X As per API 6D**
14.2	Air Test	**5.6 - 7**	**2X As per API 6D**

15.0 **Valve Painting Specification**

15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900

15.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

16.0 Lock Open/ Lock Close Requirement : N.A.

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
4. Charpy V- notch & Hardness test for body, plug, cover, stem & studs/nuts shall be conducted as per Clause No.: 3.4 & 3.5 of TS respectively.
5. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
6. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
7. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**
8. Minimum thickness of valve body / adapter / cover shall not be less than that specified in ASME B16.34.
9. Painting procedure of valves shall be as per Manufacturer's standard.
10. Valve shall be designed for intrinsically fire safe.
11. Plug valves shall be lubricated, inverted and pressure balanced design.
12. Valves shall have valve position indicator.
13. Gland packing assembly shall permit repair of gland packing under full line pressure.
14. Valve shall be provided with API 6D Monogram.

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REVISIONS					

REFERENCES DRG. NO.

SECTION Oil & Gas

CLIENT : IGGL

	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

PROJECT: Duliajan Feeder Line

(NB ≥ 2")

MECON LIMITED

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/PV/01 REV 0

DATA SHEET FOR PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size DN (inch): DN50(2"), DN100 (4"), DN200(8") ANSI Rating : 600# Design Standard : API 6D

3.0 MECON's Technical Specification No.: MEC/TS/05/62/003, Rev-2

4.0 Connecting Pipeline Design Pressure: 92 Kg/cm2(g) Design Temperature, °C : -29°C to 65°C

5.0 **Connecting Pipe Specification**

5.1 Material :

5.2 Diameter (OD), mm :

5.3 Thickness (mm) / Schedule :

6.0 **Valve Construction Design**

6.1.	Pattern	:	Short		Regular	√	Venturi
6.2.	End Connections	:	Flanged both ends			√	Flanged as per ASME B 16.5
		:	Butt Weld both ends				Butt Weld as per ASME B16.25
		:	Flanged one end, butt weld other end				
		:	Socket weld both ends				Socket Weld as per ASME B16.11

6.3. Flanges : a) RF √ FF RTJ NA

b) Serrated Smooth (125 to 200 microinches AARH) √ NA

7.0 **Valve Material Specification**

	Part	Material	Material Offered (Equivalent or Superior)
7.1	Body	ASTM A216 Gr. WCB	
7.2	Plug	ASTM A216 Gr. WCB + 75 microns ENP Coating	
7.3	Cover	ASTM A216 Gr. WCB	
7.4	Stem	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5	Stem Seal	As per Fire safe Cerificate	
7.6	Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : **3.0 mm** Service : **Natural Gas**

9.0	Location	:	Above Ground	√	Buried		
10.0	Stem Extension Requirement	:	Yes		No	√	
11.0	Gear Operator Requirement	:	Yes	√	No		For 4 & 8" Gear Operted with hand wheel
12.0	Actuator Requirement	:	Yes		No	√	Lever operated for 2"

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ API 607**

14.0 **Valve Testing Requirement**

14.1

Hydrostatic Test	Min. Test Pressure kg/cm2(g)	Minimum Duration, minutes
Body	**157**	**2X As per API 6D**
Seat	**114**	**2X As per API 6D**

14.2

Air Test	**5.6 - 7**	**2X As per API 6D**

15.0 **Valve Painting Specification**

15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

15.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

16.0 Lock Open/ Lock Close Requirement : N.A.

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
4. Charpy V- notch & Hardness test for body, plug, cover, stem & studs/nuts shall be conducted as per Clause No.: 3.4 & 3.5 of TS respectively.
5. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
6. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
7. For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
8. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**
9. Minimum thickness of valve body / adapter / cover shall not be less than that specified in ASME B16.34.
10. Painting procedure of valves shall be as per Manufacturer's standard.
11. Valves shall have valve position indicator.
12. Gland packing assembly shall permit repair of gland packing under full line pressure.
13. Valve shall be designed for intrinsically fire safe.
14. Valve shall be provided with API 6D Monogram.
15. Plug valve shall be lubricated, inverted and pressure balanced design.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
REVISIONS					

REFERENCES DRG. NO.

SECTION Oil & Gas

CLIENT : IGGL

	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

PROJECT: Duliajan Feeder Line

(NB ≥ 2")

MECON LIMITED

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/PV/02 REV 0

DATA SHEET FOR EXTENDED STEM PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size DN (inch): DN200(8") ANSI Rating : 600# Design Standard : API 6D

3.0 MECON's Technical Specification No.: MEC/TS/05/62/003, Rev-2

4.0 Connecting Pipeline Design Pressure: 92 Kg/cm2(g) Design Temperature, °C : -29°C to 65°C

5.0	**Connecting Pipe Specification**		DN 200 (8")
5.1	Material	:	API 5L GR.B PSL 2
5.2	Diameter (OD), mm	:	219.07mm
5.3	Thickness (mm) / Schedule	:	14.3mm

6.0 **Valve Construction Design**

6.1.	Pattern	:	Short		Regular	√	Venturi
6.2.	End Connections	:	Flanged both ends				Flanged as per ASME B 16.5
		:	Butt Weld both ends			√	Butt Weld as per ASME B16.25
		:	Flanged one end, butt weld other end				
		:	Socket weld both ends				Socket Weld as per ASME B16.11

6.3. Flanges : a) RF FF RTJ NA √

b) Serrated Smooth (125 to 200 microinches AARH) NA √

7.0 **Valve Material Specification**

	Part	Material	Material Offered (Equivalent or Superior)
7.1	Body	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.2	Plug	(ASTM A216 Gr. WCB/ A234 Gr. WPB) + 75 microns ENP Coating	
7.3	Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.4	Stem	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5	Stem Seal	As per Fire safe certificate	
7.6	Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance : **3.0 mm** Service : **Natural Gas**

9.0	Location	:	Above Ground √	Buried		
10.0	Stem Extension Requirement	:	Yes √	No		
11.0	Gear Operator Requirement	:	Yes √	No		For 8" Gear operted with Handwheel
12.0	Actuator Requirement	:	Yes	No	√	

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ API 607**

Length of extended stem shall be 2750±250 which shall be finalized during drawing approval stage.

14.0 **Valve Testing Requirement**

14.1

Hydrostatic Test	Min. Test Pressure kg/cm2(g)	Minimum Duration, minutes
Body	**157**	**2X As per API 6D**
Seat	**114**	**2X As per API 6D**

14.2

Air Test	**5.6 - 7**	**2X As per API 6D**

15.0 **Valve Painting Specification**

15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

15.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 600 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

16.0 Lock Open/ Lock Close Requirement : N.A.

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
4. Charpy V- notch & Hardness test for body, plug, cover, stem & studs/nuts shall be conducted as per Clause No.: 3.4 & 3.5 of TS respectively.
5. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
6. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
7. For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
8. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**
9. Minimum thickness of valve body / adapter / cover shall not be less than that specified in ASME B16.34.
10. Valves shall have valve position indicator.
11. Gland packing assembly shall permit repair of gland packing under full line pressure.
12. Valve shall be designed for intrinsically fire safe.
13. Plug valve shall be lubricated, inverted and pressure balanced design.
14. Painting procedure of valves shall be as per Manufacturer's standard.
15. Valve shall be provided with API 6D Monogram

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

REFERENCES DRG. NO.

SECTION Oil & Gas

CLIENT : IGGL

	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

PROJECT: Duliajan Feeder Line

(NB ≥ 2")

MECON LIMITED

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/PV/03 REV 0

DATA SHEET FOR PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size DN (inch): DN50(4") ANSI Rating : 600# Design Standard : API 6D

3.0 MECON's Technical Specification No.: MEC/TS/05/62/003, Rev-2

4.0 Connecting Pipeline Design Pressure: 92 Kg/cm2(g) Design Temperature, °C : -29°C to 65°C

5.0	**Connecting Pipe Specification**		DN 100 (4")
5.1	Material	:	ASTM A106 GR.B
5.2	Diameter (OD), mm	:	114.3mm
5.3	Thickness (mm) / Schedule	:	XS

6.0 **Valve Construction Design**

6.1.	Pattern	:	Short		Regular	√	Venturi
6.2.	End Connections	:	Flanged both ends				Flanged as per ASME B 16.5
		:	Butt Weld both ends			√	Butt Weld as per ASME B16.25
		:	Flanged one end, butt weld other end				
		:	Socket weld both ends				Socket Weld as per ASME B16.11

6.3. Flanges : a) RF FF RTJ NA √

b) Serrated Smooth (125 to 200 microinches AARH) NA √

7.0 **Valve Material Specification**

	Part	Material	Material Offered (Equivalent or Superior)
7.1	Body	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.2	Plug	(ASTM A216 Gr. WCB/ A234 Gr. WPB) + 75 microns ENP Coating	
7.3	Cover	ASTM A216 Gr. WCB/ A234 Gr. WPB	
7.4	Stem	(AISI 4140 + 75 microns ENP Coating)/ AISI 410	
7.5	Stem Seal	As per Fire safe Certificate	
7.6	Stud Bolts/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

8.0 Corrosion Allowance **3.0 mm** Service : **Natural Gas**

9.0	Location	:	Above Ground	√	Buried		
10.0	Stem Extension Requirement	:	Yes		No	√	
11.0	Gear Operator Requirement	:	Yes	√	No		For 4" Gear Operated with Hand wheel
12.0	Actuator Requirement	:	Yes		No	√	

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ API 607**

14.0 **Valve Testing Requirement**

14.1

Hydrostatic Test	Min. Test Pressure kg/cm2(g)	Minimum Duration, minutes
Body	**157**	**2X As per API 6D**
Seat	**114**	**2X As per API 6D**

14.2

Air Test	**5.6 - 7**	**2X As per API 6D**

15.0 **Valve Painting Specification**

15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

15.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

16.0 Lock Open/ Lock Close Requirement : N.A.

Notes:

1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/003, Rev2
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
3. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
4. Charpy V- notch & Hardness test for body, plug, cover, stem & studs/nuts shall be conducted as per Clause No.: 3.4 & 3.5 of TS respectively.
5. Compressed asbestos fibre (CAF) shall not be used for body sealing / gasket materials.
6. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
7. For welding end, the out of roundness (i. e. difference between maximum and minimum ID at pipe end) shall not be more than 0.5% of pipe OD.
8. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**
9. Minimum thickness of valve body / adapter / cover shall not be less than that specified in ASME B16.34.
10. Painting procedure of valves shall be as per Manufacturer's standard.
11. Valves shall have valve position indicator.
12. Gland packing assembly shall permit repair of gland packing under full line pressure.
13. Valve shall be designed for intrinsically fire safe.
14. Plug valve shall be lubricated, inverted and pressure balanced design.
15. Valve shall be provided with API 6D Monogram

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
REVISIONS					

REFERENCES DRG. NO.

SECTION Oil & Gas	PREPARED	CHECKED	APPROVED
NAME	VKS	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

(NB ≥ 2")

MECON LIMITED

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/PV/04 REV 0

DATA SHEET FOR SOCKET WELDED PLUG VALVE

1.0 Valve Manufacturer :

2.0 Valve Size DN (inch): DN 20 (3/4") ANSI Rating : 600# Design Standard : BS 5353

3.0 MECON's Technical Specification No.: N.A.

4.0 Connecting Pipeline Design Pressure: 92 Kg/cm2(g) Design Temperature, °C : -29°C to 65°C

5.0	**Connecting Pipe Specification**		DN 20 (3/4")
5.1	Material	:	ASTM A106, Gr. B
5.2	Diameter (OD), mm	:	26.7mm
5.3	Thickness, mm	:	5.56mm

6.0 **Valve Construction Design**

6.1.	Pattern	: Short	√	Regular		Venturi
6.2.	End Connections	: Flanged both ends				Flanged as per ASME B 16.5
		: Butt Weld both ends				Butt Weld as per ASME B16.25
		: Flanged one end, butt weld other end				
		: Socket weld both ends	√			Socket Weld as per ASME B16.11

100 mm Extension Pups in ASTM A106 Gr. B,Sch. 160 at both ends

6.3.	Flanges	: a) RF		FF		RTJ	NA √
		b) Serrated		Smooth (125 to 200 microinches AARH)			NA √

7.0 **Valve Material Specification**

	Part	Material	Material Offered (Equivalent or Superior)
7.1	Body	ASTM A105	
7.2	Plug (Lubricated)	ASTM A105 + 75 microns ENP	
7.3	Cover	ASTM A105	
7.4	Stem (No Casting)	ASTM A105	
7.5	Stem Seal	As per Fire Safe Certificate of valve manufacturer	
7.6	Stud Bolts/ Nuts (If applicable)	ASTM A193 Gr. B7/ ASTM A194 Gr. 2H	

8.0 Corrosion Allowance : **3.0mm** Service : **Natural Gas**

9.0	Location	: Above Ground	√	Buried		
10.0	Stem Extension Requirement	: Yes		No	√	
11.0	Gear Operator Requirement	: Yes		No	√	Lever operated for 3/4" size
12.0	Actuator Requirement	: Yes		No	√	

13.0 Fire Resistant Design Requirement : **Type-Test as per Standard API 6FA/ API 607**

14.0 **Valve Testing Requirement**

14.1

Hydrostatic Test	Min. Test Pressure kg/cm2(g)	Minimum Duration, minutes
Body	**157**	**2**
Seat	**114**	**2**

14.2 Air Test **5.6-7** **2**

15.0 **Valve Painting Specification**

15.1 Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.

15.2 For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

16.0 Lock Open/ Lock Close Requirement : N.A.

Notes:

1. Plug valves shall be lubricated, inverted and pressure balanced design.
2. Painting procedure of valves shall be as per Manufacturer's standard.
3. Valve shall be designed for intrinsically fire safe.
4. Stops shall be provided for positive alignment of plug with ports and ensure proper installation of handle.
5. Valves shall have valve position indicator.
6. Charpy V-notch test for body, plug, stem & studs/nuts will be conducted as per ASTM A370. The minimum average absorbed energy per set of three minimum per specimen shall be as per indivisual material specification. Charpy test shall be performed at -46°C.
7. Each valve shall be provided with a wrench.
8. Gland packing assembly shall permit repair of gland packing under full line pressure.
9. All pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
10. Material Test Certificates and Hydro Test Reports shall be furnished prior to dispatch.
11. Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for Purchaser's approval prior to manufacture of the valves.Valves shall be inspected and approved by Purchaser before despatch.
12. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S., API 6D and other relevant standards.
13. Bidder shall clearly write valves material (equivalent or superior) offered by them against each part/material of valve in the space provided for. Wherever bidder agrees with valves material as mentioned above in MECON's data sheet, bidder shall clearly indicate "AGREED".
14. Minimum thickness of valve body / adapter / cover shall not be less than that specified in the design standard + corrosion allowance .

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
REVISIONS					

REFERENCES DRG. NO.

SECTION Oil & Gas	PREPARED	CHECKED	APPROVED
NAME	AM	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

DATASHEET FOR PLUG VALVES (NB < 2")

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/PV/05 REV 0

DATA SHEET FOR GLOBE VALVES

2. Size **: 4"** Rating : ANSI 600# Design Standard ': ISO 15761 / BS:1873/ API 623

3. Construction: Straight Pattern (OS & Y)

4. Purchaser's Specification **: Refer Technical notes for Gate & Globe Valves**

5. Design Pressure **: 92 kg/cm^2(g)** Design Temperature **: -29°C to + 65°C**

6. Corrosion Allowance **: 3.0 mm** Service Natural Gas

7. End Connections :

Flanged both ends as per ASME B 16.5 (RF -125 to 200 AARH)	√
Butt Weld both ends as A-16.25	
Flanged one end butt weld other end	
Socket weld both ends as per ASME B16.11	

7. Flanges (where applicable) : a) RF [√] FF [ ] RTJ [ ]

8. Connecting Pipe Specification **: NA**

9. Valve Material Specification :

	Part	Material	Material Offered (Equivalent or Superior)
9.1	Body	**ASTM A 216 Gr.WCB / A 105N**	
9.2	Bonnet (Bolted)	**ASTM A 216 Gr.WCB / A 105N**	
9.3	Stem (Rising)	**13% Cr. Steel (No Casting)**	
9.4	GLAND / GLAND FLANGE / Gland Follower/ Gland Plate / Packing Gland etc.	**ASTM A105N**	
9.5	Disc(Loose Plug/Ball Type)	**(ASTM A 216 Gr. WCB + 13% Cr Steel Facing) / 13% Cr Steel (Stellited)**	
9.6	Seat / Back seat Ring	**13% Cr Steel (Stellited)**	
9.7	Stem Packing (Renewable with valve open on stream)	**Top & bottom ring: Braided graphite Intermediate ring: Corrosion inhibited die formed flexible graphite with braided anti extrusion rings**	
9.8	Hand Wheel (Non Rising)	**Malleable Iron/ Ductile iron/ Carbon steel**	
9.9	Bonnet Bolts	**A 193 Gr. B7**	
9.10	Bonnet Nuts	**A194 Gr. 2H**	
9.11	Bonnet Gasket	**Spiral Wound SS 316 + Grafoil as per ASME B 16.20**	

10. Location: Underground [ ] Aboveground [√]

11. Manual operated : Yes [√] No [ ] Handwheel Operated

12. Hydrostatic Test Pressure
a) Body **: 157 kg/cm^2(g)**
b) Seat and backseat **: 114 kg/cm^2(g)**

13. Pnuematic Test Pressure with Air **: 5.6 - 7 kg/cm2 (g).**

14. Painting Specifications:
i) Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.
ii) For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.

Notes:
1. Valve specification sheet shall be read in conjunction with technical notes for Gate and Globe valves.
2. Valve shall be designed for intrinsically fire safe.
3. Testing shall be as per approved QAP respective design standard .
4. Valves shall have mark for flow direction integral on valve body.
5. Bidder shall clearly write all/ any deviation against each part/ material of valve in the space provided for. Wherever bidder agrees with MECON's data sheet, bidder shall clearly indicate "agreed".
6. Stem packing shall be renewable with valve open on stream .
7. All valve assemblies, inclusive of operators with a weight over 50kg shall be provided with adequate integral lifting points.
8. Material Test Certificates and Hydro Test Reports shall be furnished prior to dispatch.
9. Minimum thickness of valve body / adapter shall not be less than as per ISO 15761 / BS:1873/ API 623 + 1.5 mm CA
10. Valves shall have mechanical position indicator showing percentage opening.

REV. NO.	DATE	ZONE		DESCRIPTIONS		BY	APPRD				
REVISIONS								REFERENCES		DRG. NO.	

SECTION Oil & Gas	PREPARED	CHECKED	APPROVED
NAME	Vikash	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

CLIENT : IGGL

PROJECT: Duliajan Feeder Line

MECON LIMITED

DATA SHEET FOR GLOBE VALVES (NB ≥ 2" D1A)

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/GV/01 REV 0

DATA SHEET FOR SWING CHECK VALVES

1.0 Valve Manufacturer :

2.0 Service : NATURAL GAS

3.0 Valve Size (NB), mm (inch) : 24" ANSI Rating : 600# Design Standard : **API 6D**

4.0 MECON's Technical Specification No. : **MEC/TS/05/62/004,Rev-2** Design Temperature, °C: -29°C to + 65°C

5.0 Connecting Pipeline Design Pressure : **: 92 kg/cm^2(g)**

6.0 **Connecting Pipe Specification** : N.A
6.1 Material :
6.2 Diameter (OD), mm (inch) :
6.3 Thickness, mm :

7.0 **Valve Construction Design**
7.1 Type : SWING CHECK TYPE

7.2 End Connections :
- **Flanged both ends as pe ASME B16.5** [√]
- **Butt Weld both ends** [ ]
- **Flanged one end, butt weld other end** [ ]
- **Socket Weld as per ASME B 16.11** [ ]

7.3 Flanges (wherever applicable) : a) RF [√] FF [ ] RTJ [ ] NA [ ]
b) Serrated [ ] Smooth (125 to 200 microinches AARH) [√] NA [ ]

8.0 **Valve Material Specification**

	Part	Specified Material	Material Offered (Equivalent or Superior
8.1	Body	**ASTM A 216 Gr.WCB**	
8.2	Cover	**ASTM A 216 Gr.WCB**	
8.3	Disc/ Plates	**(ASTM A 216 Gr. WCB + 13% Cr Steel Facing) / 13% Cr Steel (Stellited)**	
8.4	Body Seat (See Note-3)	**ASTM A 216 Gr. WCB+13% Cr Steel Facing (Stellited)**	
8.5	Disc Hinge	**ASTM A 216 Gr. WCB/ A 515 Gr. 70/ 13% Cr Steel**	
8.6	Hinge Pin	**13% Cr Steel (No Casting)**	
8.7	Cover Stud Bolts	**ASTM A 193 Gr. B7**	
8.8	Nuts	**ASTM A 194 Gr. 2H**	
8.9	Cover Gasket	**SS 304/316 Spiral Wound with Grafoil**	
8.1	Spring	**Inconel X-750**	

9.0 Corrosion Allowance : **3.0 mm**

10.0 Fire Resistant Design Requirement : **N.A.**

11.0 **Valve Testing Requirement**

			Test Pressure (min.), kg/cm2(g)	Minimum Duration, minutes
12	Hydrostatic Test	Body	**157**	**2X As per API 6D**
		Seat	**114**	**2X As per API 6D**
	Air Test		**5.6-7**	**2X As per API 6D**

13 .0 **Valve Painting Specification**
i) Surface preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 900.
ii) For above ground installation-Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shall be within 80 to 120 micron).

14.0 Lock Open/ Lock Close Requirement : **N.A.**

Notes:
1. This Valve Data Sheet shall be read in conjunction with MECON's Technical Specification No. MEC/TS/05/62/004,Rev-2.
2. Inspection and Testing shall be as per attached QAP ,this Data Sheet, MECON's Technical Specification No. MEC/TS/05/62/004,Rev-2, API 6D, API 598 and other relevant standards.
3. Seats shall be non-renewable integral type.
4. Bidder shall clearly write all/ any deviation against each part/ material of valve in the space provided for .
5. Wherever bidder agrees with MECON's data sheet, bidder shall clearly indicate "agreed".
6. Charpy 'V' notch test on each heat of base material shall be conducted for all pressure containing & controlling parts such as body, bonnet, stem, disc, body seat, end flange, welding ends as well as the bolting material as per ASTM A370. The test shall be conducted at 0°C.The minimum average absorbed energy per set of three specimen shall be 27 J with an individual minimum per specimen of 22 J.
7. Hardness test shall be carried out on each heat of base material for all pressure containing parts of the valve. A full thickness cross section shall be taken for this purpose and the maximum hardness shall not exceed 248 HV10 based on minimum four measurements representing the entire thickness.
8. Painting procedure of the valves shall be as per Manufacturer's Standard.
9. Material Test Certificates and Hydro Test Reports shall be furnished prior to dispatch.
10. Minimum thickness of valve body and adapter shall not be less than that specified in ASME B16.34 plus 1.5 mm corrosion allowance specified in this datasheet .
11 Valve shall be provided with API 6D Monogram

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
			REVISIONS		

	PREPARED	CHECKED	APPROVED
NAME	AM	AM	HK
DATE	02.07.2026	02.07.2026	02.07.2026
SIGN			

SECTION Oil & Gas

CLIENT : IGGL

PROJECT: **Duliajan Feeder Line**

DATA SHEET FOR CHECK VALVES (NB ≥ 2")

REFERENCES DRG. NO.

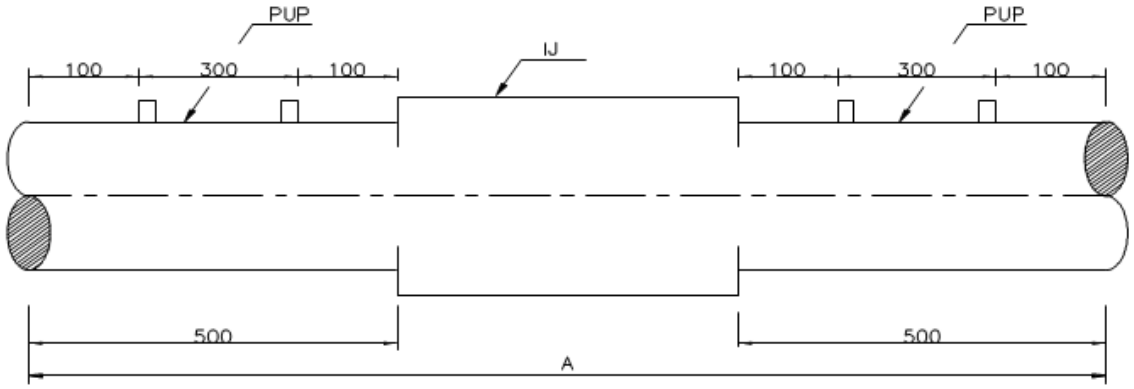
MECON LIMITED

SCALE :

REV 0

DATA SHEET NO.: MEC/05/28/E/0085/M/001/DS/CV/01

DATA SHEET FOR INSULATING JOINTS



A = OVERALL LENGTH OF IJ TO BE CONFIRMED BY MANUFACTURER.

1. MR ITEM NO. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/009
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm2 (g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : Natural Gas
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM (INCHES) : 600 (24")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME SECTION-VIII DIV-I
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm2 (g)
13. CHARPY TEST (BODY, WELDING ENDS) : REQUIRED AS PER TECHNICAL SPEC. & ASTM A370
14. HARDNESS TEST : REQUIRED AS PER TECHNICAL SPEC. & ASTM A370
15. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
    A) BODY : ASTM A-694, F-70
    B) PUPS : API 5L GR. X-70 PSL-2, 12.7 mm THK.(MIN.)
    C) INSULATING MATERIAL : ASTM D709 G10/ G11
16. CONNECTING PIPE SPECIFICATION

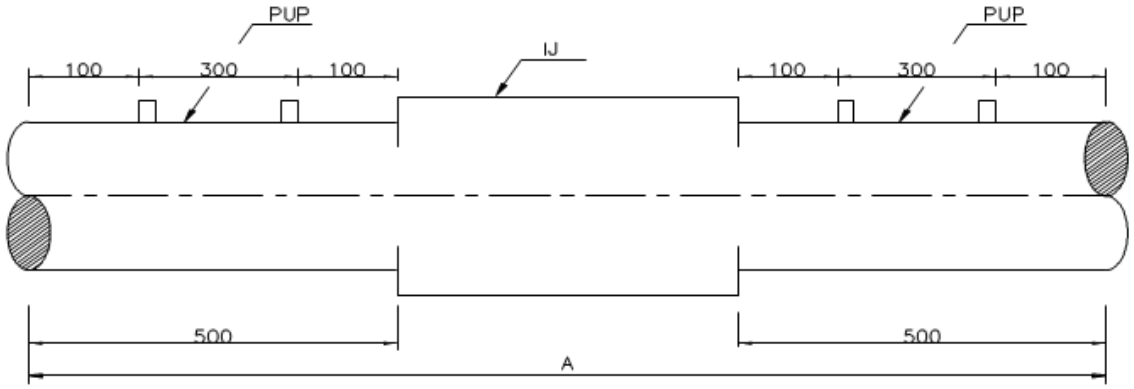
SIZE, NB, MM (INCHES)	600 (24")
WALL THICKNESS, MM(MIN.)	12.7
GRADE	API 5L Gr. X-70 PSL 2

17. SPECIAL REQUIREMENTS : INSULATION JOINT SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

Note: Manufacturer shall ensure that the wall thickness (W.T.) of all parts of insulating joint shall be adequate to sustain design pressure and selected W.T. shall be suitable for welding with W.T. of connected pipeline.

REV. NO	DATE	ZONE	DESCRIPTIONS	BY	APPRD	
REVISIONS					REFERENCES	DRG. NO.
SECTION PROCUREMENT				**CLIENT: IGGL**		
	PREPARED	CHECKED	APPROVED			
DSGN	CSV	A.M	H.K	**PROJECT: DULIAJAN FEEDER LINE**		MECON LTD.
DATE	04.07.2026	04.07.2026	04.07.2026			
DATA SHEET FOR INSULATING JOINTS					Data Sheet No.MEC/E/0085/05/21/M/00/DS-009-01	REV 0

DATA SHEET FOR INSULATING JOINTS



A = OVERALL LENGTH OF IJ TO BE CONFIRMED BY MANUFACTURER.

1. MR ITEM NO. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/009
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm2 (g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : Natural Gas
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM (INCHES) : 200 (08")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME SECTION-VIII DIV-I
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm2 (g)
13. CHARPY TEST (BODY, WELDING ENDS) : REQUIRED AS PER TECHNICAL SPEC. & ASTM A370
14. HARDNESS TEST : REQUIRED AS PER TECHNICAL SPEC. & ASTM A370
15. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
    A) BODY : ASTM A105
    B) PUPS : API 5L GR. B PSL-2, 14.3 mm THK.(MIN.)
    C) INSULATING MATERIAL : ASTM D709 G10/ G11
16. CONNECTING PIPE SPECIFICATION

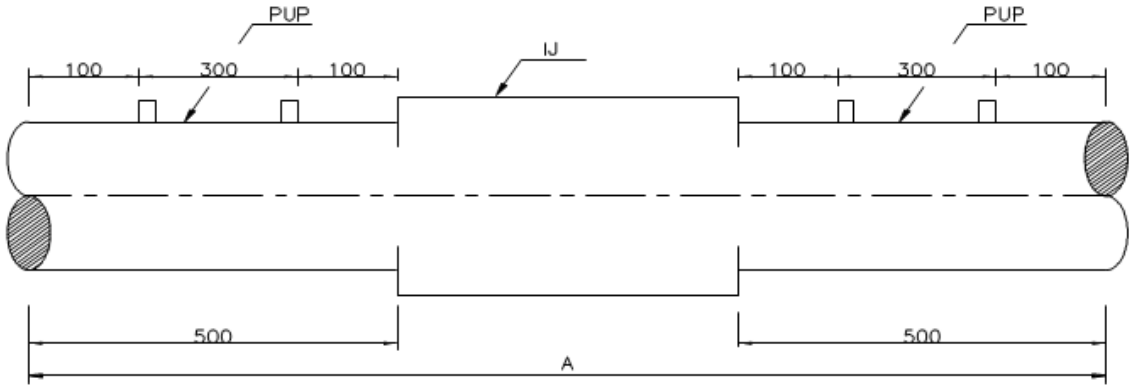
SIZE, NB, MM (INCHES)	200 (08")
WALL THICKNESS, MM(MIN.)	14.3
GRADE	API 5L Gr. B PSL 2

17. SPECIAL REQUIREMENTS : INSULATION JOINT SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

Note: Manufacturer shall ensure that the wall thickness (W.T.) of all parts of insulating joint shall be adequate to sustain design pressure and selected W.T. shall be suitable for welding with W.T. of connected pipeline.

REV. NO	DATE	ZONE	DESCRIPTIONS	BY	APPRD	
REVISIONS					REFERENCES	DRG. NO.
SECTION PROCUREMENT				**CLIENT: IGGL**		
	PREPARED	CHECKED	APPROVED			
DSGN	CSV	A.M	H.K	**PROJECT: DULIAJAN FEEDER LINE**		MECON LTD.
DATE	04.07.2026	04.07.2026	04.07.2026			
DATA SHEET FOR INSULATING JOINTS					Data Sheet No.MEC/E/0085/05/21/M/00/DS-009-02	REV 0

DATA SHEET FOR INSULATING JOINTS



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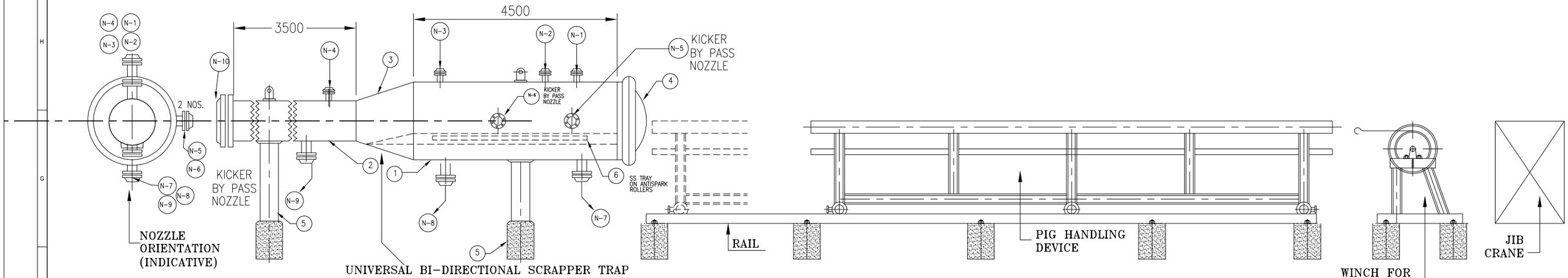
1. MR ITEM NO. :
2. PURCHASER'S SPECIFICATION NO. : MEC/TS/05/21/009
3. RATING : 600#
4. DESIGN PRESSURE : 92 Kg/cm2 (g)
5. DESIGN TEMPERATURE : -29°C to 65°C
6. SERVICE : Natural Gas
7. CORROSION ALLOWANCE : 1.5 MM
8. SIZE NB MM (INCHES) : 50 (02")
9. END CONNECTION : BUTT-WELD AT BOTH ENDS
10. DESIGN CODE : ASME SECTION-VIII DIV-I
11. DESIGN FACTOR : 0.5
12. HYDROSTATIC TEST PRESSURE : 138 Kg/cm2 (g)
13. CHARPY TEST (BODY, WELDING ENDS) : REQUIRED AS PER TECHNICAL SPEC. & ASTM A370
14. HARDNESS TEST : REQUIRED AS PER TECHNICAL SPEC. & ASTM A370
15. MATERIALS SPECIFICATION (EQUIVALENT OR SUPERIOR)
    A) BODY : ASTM A 105
    B) PUPS : ASTM A106 Gr B (CHARPY), 5.54 mm THK.(MIN.)
    C) INSULATING MATERIAL : ASTM D709 G10/ G11
16. CONNECTING PIPE SPECIFICATION

SIZE, NB, MM (INCHES)	50 (02")
WALL THICKNESS, MM(MIN.)	5.54
GRADE	ASTM A106 Gr B (CHARPY)

17. SPECIAL REQUIREMENTS : INSULATION JOINT SHALL BE SUITABLE FOR ABOVE GROUND INSTALLATION

Note: Manufacturer shall ensure that the wall thickness (W.T.) of all parts of insulating joint shall be adequate to sustain design pressure and selected W.T. shall be suitable for welding with W.T. of connected pipeline.

REV. NO	DATE	ZONE	DESCRIPTIONS	BY	APPRD	
REVISIONS					REFERENCES	DRG. NO.
SECTION PROCUREMENT				**CLIENT: IGGL**		
	PREPARED	CHECKED	APPROVED			
DSGN	CSV	A.M	H.K	**PROJECT: DULIAJAN FEEDER LINE**		MECON LTD.
DATE	04.07.2026	04.07.2026	04.07.2026			
DATA SHEET FOR INSULATING JOINTS					Data Sheet No.MEC/E/0085/05/21/M/00/DS-009-03	REV 0



TYPICAL GENERAL ARRANGEMENT

CONNECTING PIPELINE DETAILS:-

ANSI RATING (#)	: 600#	PIPELINE Thk.	: 12.7 mm
DESIGN PRESSURE (KG/CM^2-G)	: 92	MATERIAL	: API 5L GR. X-70, PSL-2
DESIGN TEMPERATURE (°C)	: (-)29 to (+)65	SERVICE	: Natural Gas
PIPELINE DESIGN FACTOR	: 0.5	DESIGN CODE	: ASME B 31.8

SCRAPPER TRAP SPECIFICATION :-

MECON'S SPECIFICATION NO. MEC/S/05/62/007 Ed.0 Rev0

ITEM NO./ NOZZLE NO.	DESCRIPTION	COMPONENT	ENDS/TYPES	MATERIAL CODE	MINIMUM SPECIFIED MATERIAL	MATERIAL AS GIVEN BY THE BIDDER	NB/THICKNESS (mm)
1.	BODY(MAJOR BARREL)	PIPE	BW	API 5L	API 5L,Gr.X-70 PSL 2	*	30"/*
2.	NECK(MINOR BARREL)	PIPE	BW	API 5L	API 5L Gr X-70,PSL 2	*	24"/*
3.	REDUCER	CONCENTRIC	BW, WELDED	MSS-SP-75	MSS-SP-75 Gr WPHY-70	*	30"x24"/*
4.	END CLOSURE	FORGED	QUICK OPENING	ASME SECTION VIII	ASTM A 694 GR. F-70 (CHARPY)	*	30", 600#
5.	SUPPORTS	PLATE	WELDED	ASTM A 36 /IS 2062	*	*	AS REQUIRED
6.	PERFORATED PIG HANDLING TRAY/FILTERING BASKET	SS	-		SS304	*	6 MM THK
N-2	VARIOUS CONNECT. (1 NOS.)	SOCKOLET/PIPE/FL	SW 6000#/SMLS PE /SWRF	MSS-SP-97/B 36.10 /B 16.5	A105/A106 Gr.B/A105	*	3/4"/S160
N-1/3/4	VARIOUS CONNECT. (3 NOS.)	WELDOLET/PIPE/FL	BW/SMLS BE/WNRF	MSS-SP-97/B 36.10 /B 16.5	A105 (CHARPY)/A106 Gr.B (CHARPY)/A105 (CHARPY)	*	2"/S80
N-7/8/9	VARIOUS CONNECT. (03 NOS.)	WELDOLET/PIPE/FL	BW/SMLS BE/WNRF	MSS-SP-97/B 36.10 /B 16.5	A105 (CHARPY)/A106 Gr.B (CHARPY)/A105 (CHARPY)	*	4"/XS
N-5/6	KICKER BYPASS (02 NOS)	WELDOLET/PIPE/FL	BW/SMLS BE/WNRF	MSS-SP-97/API 5L /B 16.5	A694 F-52(CHARPY)/API 5L GR B PSL 2 /A694 F-52(CHARPY)	*	08"/14.3
N-10	CONNECTION FLANGE	FLANGE	WNRF	B 16.5	ASTM A694 GR F-70 (CHARPY)	*	24/*

TOLERANCE

1. Diameter and out of roundness tolerances for the minor barrel shall be in accordance with the requirements of API Spec 5L for Line Pipe.
2. The maximum straightness deviation, measured at the outside surface of the cylinder from a straight line parallel to the vessel axis, shall not exceed 1.5mm per 1000 mm cylindrical shell length. Tolerance on overall length shall be to +10 mm with respect to approved drawings.
3. Nozzles tolerances with respect to approved drawings shall be in accordance with the following requirements:
   Position : Measure from neck end +6 mm
   Projection : Measure from shell outer surface +3mm
4. Alignment of nozzle flange face : Max. ½ deg in any direction from true vessel axis and true radial centre line
   Radial : Measured from reference centre line to centre line of nozzle +2mm
   Bolt hole : Maximum total indicated run-out 0.2mm from true position.
5. Misalignment of end closure flange face shall be max +1 deg in any direction.

25. For Pig Signaller refer Datasheet of Non Intrusive Pig Signaller.
26. Charpy V-Notch test shall be carried out for all the wetted parts including stud-bolts, nuts, gaskets, etc at -29 deg C
27. ARRANGEMENT FOR RAILS INCLUDING FOUNDATION BOLTS, IF ANY, SHALL BE SUPPLIED ALONG WITH PIG HANDLING DEVICE.
28. MANUFACTURER TO FURNISH DOCUMENTATION SUCH AS MANUAL FOR INSTALLATION, ERECTION INSTRUCTION, MAINTAINANCE & OPERATION INSTRUCTION ETC. FOR HANDLING DEVICES AS REQUIRED FOR PIG TRAPS.
29. PIG HANDLING SYSTEM, PUSHING ROD MECHANISM & TROLLEY SHALL BE OF DISMANTLED TYPE

NOTES:

1. ORIENTATION OF ALL NOZZLES IS INDICATIVE AND SHALL BE CONFIRMED DURING DRAWING APPROVAL STAGE.
2. THICKNESS OF BODY, NECK & REDUCER SHALL BE INDICATED BY MANUFACTURER BASED ON PIPELINE DESIGN CONDITIONS AND MANUFACTURING REQUIREMENTS. NECESSARY CALCULATIONS SHALL BE SUBMITTED TO MECON FOR REVIEW/ APPROVAL.
3. CORROSION ALLOWANCE(CA) OF 3 MM SHALL BE CONSIDERED FOR DESIGN OF COMPLETE SCRAPPER TRAPS. ALLOWABLE STRESS FOR EQUIPMENT SHALL BE AS PER ASME SECTION II, PART D.
4. FLANGES – AS PER ASME B 16.5, 16.47A AS APPLICABLE.
5. HYDRAULIC TEST PR.=1.5 TIMES THE DESIGN PR., HYDROTEST DURATION FOR COMPLETE SCRAPPER LAUNCHER ASSEMBLY INCLUDING PIG SIGNALLER SHALL BE 1 Hr.
6. RADIOGRAPHY 100% ALL BUTT WELDED JOINTS.
7. PIG SIGNALLER AS PER SPEC. NO. MEC/S/05/62/048, REV-0
8. BI-DIRECTIONAL SCRAPPER TRAP SHALL BE COMPATIBLE FOR ACCOMODATING LATEST ONLINE INSPECTION TOOL/ INTELLIGENT PIGGING (LONGEST).
9. PAINTING:-
   (i) SURFACE PREPARATION BY SHOT BLASTING AS PER GRADE SA 2 1/2 SWEDISH STD. SIS-055909.
   (ii) THREE COATS OF PAINT SHALL BE APPLIED WITH MINIMUM THICKNESS OF 300 MICRON (PERMISSIBLE THICKNESS IN EACH COAT SHALL BE 80-120 MICRON)
   (iii) FINAL SHADE OF PAINTING SHALL BE DECIDED DURING DRAWING APPROVAL STAGE.
10. CHARPY-V NOTCH TEST AND HARDNESS TEST SHALL BE CONDUCTED AS PER CLAUSE NO. 3.4 & 3.5 RESPECTIVELY OF MECON TS.
11. DOORLOCK OF QOC OF EACH SCRAPER TRAP SHALL HAVE A SAFETY RELIEF SYSTEM ALLOWING THE OPENING OF DOOR ONLY WHEN THERE IS NO PRESSURE IN THE TRAP.
12. QUICK OPENING CLOSURE SHALL BE OF HINGED TYPE AND INCLUDE SAFETY DEVICE TO PREVENT OPENING BEFORE DEPRESSURISING IN COMPLIANCE WITH ASME-SECTION VIII, DIV 1 UG-35(b) OF ASME BOILER AND PRESSURE VESSEL CODE.
13. MATCHING FLANGES FOR ALL NOZZLES SHALL BE PROVIDED EXCEPT FOR NOZZLE N-7/8/9 FOR WHICH BLIND FLANGE (BLRF) FLANGE TO BE PROVIDED . ALL FLANGES/BLINDS SUPPLIED WITH SCRAPPER TRAPS SHALL HAVE SMOOTH FACE FINISH TO 125 AARH.
14. REINFORCEMENT PAD FOR SUPPORT FOR BARREL SHALL BE PROVIDED OF SAME MATERIAL AS PROVIDED FOR BARREL.
15. ALL NOZZLES SHALL HAVE A MINIMUM PROJECTION OF 200MM AND INTER DISTANCE BETWEEN NOZZLES SHALL BE MINIMUM 300MM.
16. PIG HANDLING SYSTEM SHALL BE SUITABLE FOR INSERTING AND RETRACTING OF ALL TYPES OF INSTRUMENTED/INTELLIGENT PIGS FROM THE TRAP.
17. PIG HANDLING SYSTEM, PUSHING ROD MECHANISM & TROLLEY SHALL BE OF DISMANTLED TYPE.
18. ALL FOUNDATION BOLTS SHALL BE PROVIDED WITH DUE APPROVAL OF ITS DETAIL DRAWINGS FROM MECON
19. THICKNESS OF MINOR BARREL SHALL BE EITHER CALCULATED THICHNESS WITH 3 MM CA OR CONNECTING PIPE THICKNESS WHICHEVER IS HIGHER.
20. JIB CRANE WITH 360 DEGREE SWING ARM SHALL BE SUPPLIED WITH DULY CERTIFIED LOAD TEST DETAILS.
21. VENDOR SHALL PROVIDE FOUNDATION LOAD DATA FOR ALL EQUIPMENTS ANCHORED TO THE GROUND.
22. Interlock is also required for PIG Vent and QOEC door (in-addition to interlock for drain valve)
23. VENDOR SHALL PROVIDE THE JIB CRANE & THE HOIST WITH ANTI-SPARK PARTS
24. Jib Crane+Chain Pulley block shall be tested as per the statuary requirement and certificate issued by comptent authority .

LEGEND:

SMLS – SEAMLESS, BW – BUTT WELDED,
SW – SOCKET WELDED, SWRF-SOCKET WELD RAISED FACE
FL-FLANGE, WNRF-WELDNECK RAISED FACE

NOTES :
* VENDOR TO INDICATE
**TO BE FURNISHED LATER

WELD NECK END THICKNESS OF MATCHING FLANGE (WNRF) FOR NOZZLE N10 SHALL BE SAME AS THAT OF CONNECTING PIPELINE THICKNESS.

THE ABOVE SKETCH IS INDICATIVE. MANUFACTURER TO DEVELOP GENERAL ARRANGEMENT DRAWING OF HANDLING SYSTEM FOR UNI-DIRECTIONAL PIG LAUNCHER.

REV	REV.NO	DATE	ZONE	DESCRIPTION	BY	VERIFIED
0	0	20.01.26	–	As per P&ID, Drg. No. MEC/0063/05/28/P/MHPL/PID/001 Rev 3	AM	HK

REVISION

SEC: CONCURRED BY

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FOR TENDER PURPOSE ONLY

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MECON LIMITED

SECTION	OIL & GAS
LOCATION	NEW DELHI
DESIGNED	Charan Singh Verma, Dy Mgr
DRAWN	Charan Singh Verma, Dy Mgr
CHECKED AND VERIFIED	Ashish Mathur, AGM
APPROVED	Harsh Kumar, DGM
DATE	04.07.2026

DULIAJAN FEEDER LINE

UNIVERSAL BI-DIRECTIONAL SCRAPPER LAUNCHER / RECEIVER (30" X 24", 600#)

TAG Nos. : SLR-0101 , SRL-0701, SLR-0702, SRL-1201

SCALE : NTS | SHEET 1 OF 1 | REV 0

DATASHEET NO.-MEC/E/0085/05/28/M/001/DS/ST-001

DATASHEET

FOR

PIG SIGNALLER

ON

PIPELINE

(NON-INTRUSIVE TYPE)

Pig Barrel Manufacturer	As per tender
Purchaser's Specification	Refer Specification
Tag Number	TBC
Pig Detection	At Passage
PIG Signaller Type	Non-Intrusive (Bi-Directional)
DESIGN DATA FOR LINE PIPE	
Service	Natural Gas
Size (OD), mm (inch)	Refer P&ID
Design Pressure	Refer P&ID
Rating	Refer P&ID
Design Temperature (□C)	Refer P&ID
Pipe Material and Grade	API 5L Grade
Corrosion Allowance, mm	0
Multiphase Product	No
Design Code	ASME BPVC SEC VIII Div 1 (Latest edition), ASME B31.8 (Latest edition)
SENSING ELEMENT	
Detection Principle	Ultrasonic type or Magnetic Type
Connection	Universal Clamp-on type with SS 316 straps.
Signal Output	(a) Potential free contact rated to 24V DC, 2A, DPDT (b) Serial Interface – Vendor to Advice
Particle & Pig Detection	Required and Pig Signaller shall be capable of detecting all type of pigging devices (permanent magnet type and transmitter equipped intelligent pigs).
Sensor Element	Piezo Electric Crystal or Magnetic Type
Self testing capability	Required
Detection Speed	Vendor To Advice
Repeatability	+/-1%
Signal Interface	Local Control Panel & RTU
Housing	Hermetically sealed SS316
ENCLOSURE	
Switch Enclosure Material	SS 316
Hazardous Area Classification	Zone-1, Gas Group IIA/IIB, Temp Class T3
Electrical & Weather Protection	Ex 'ia' & IP 65 or better
Cable connection	1/2" NPT(F) - 3 nos., Spare entry plugged with certified plugs.
Certification	Manufactured Abroad - ATEX/IEC/BASEEFA/UM/FL, etc.; Manufactured India - CMRI/BIS; Mandatory Certification- CCOE/PESO
Power Supply	24 VDC
Cables	Vendor to provide sensor cable between sensor & termination box. Vendor to consider a length of 5 meters between sensor and termination box. All cables shall be terminated in terminal strips. Flying leads shall not be provided. Separate terminal strips to be considered for power and signals.
Earthing	Shall be provided as per IEC 60364.
PIG DETAILS	
Pig Material / Coating	Carbon Steel, Poly urethane , Steel and Plastic
Pig Length	600mm ~ 3000mm (indicative)
Pig Diameter	90% ~ 100% of Pipeline ID
Pig Velocity (Max.)	8 m/s (indicative)
Marking	As per specification
OTHERS	

Local Indicator	To be provided (visible/locate from min. 5 meters)
Local Reset Button	To be provided as applicable (visible/locate from min. 5 meters)
Data Storage Capacity	Up to 60 days of measurement data and minimum 99 events
Inbuilt Battery	Required with a minimum lifespan of 1 year. All Pig Signaler shall have two (2) nos. of inbuilt batteries (1 working + 1 spare).
Termination Junction Box	Required. Termination box of EExe / EEx'd' type shall be suitable for hazardous area classification for connecting the sensor cables, power and signal cables, the light indication and reset switch as applicable. Junction box shall also be Weather proof to IP 65.
Bolting & Nut Material	ASTM A 320 L7 & ASTM A194 Gr.4/ Gr.7
Seals	Viton
INSPECTION AND TESTS	Manufacturer shall perform all inspections and tests as per the requirements of this specification and the relevant codes, standards and specifications, prior to shipment at his Works. Such inspections and tests shall be, but not limited to, the following - All Pig Signallers shall be visually inspected. The internal and external surfaces shall be free from any strikes, gouges and other detrimental defects. The surface shall be thoroughly cleaned and free from dirt, rust and scales. Testing and assembly procedure shall be detailed by Manufacturer and implemented during the work. Welding inspection and testing shall be performed before and coating or painting is applied.
SPARES AND ACCESSORIES	Manufacturer shall furnish list of recommended spares and accessories for pig signaller required during start-up and commissioning and supply of such spares shall be included in the price quoted by manufacturer. Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of Pig Signallers and price for such spares shall be quoted separately. Manufacturer shall provide special tools required for operation and maintenance as a part of supply, this includes but not limited to - Any type of communicator/cables/connectors for configurations; Any Special tools required for maintenance like special type of Allen Key etc.

MOUNTING

The Pig Signaller / detectors sensor is mounted in hermetically sealed AISI SS316L housing and to be clamped to the external surface of the pipe.

NOTES:

1	All field electronic shall be sealed in an epoxy resin for protection.
2	Vendor to provide sensor cable between sensor & termination junction box.
3	The total weight of Pig Signaler assembly should not exceed 10.0 Kg.
4	All the Mounting accessories (SS 316) with suitable insulating material shall be provided by Vendor to avoid Bimetallic Corrosion.
5	Vendor to confirm whether External power is required or not.
6	Vendor to provide a wiring schematic to indicate the terminal size, entry size of the termination box for customer cable entry.
7	Vendor shall also provide model number along with Model de-codification sheet in the offer.
8	Vendor shall provide the detector with FRP UV protective canopy.
9	Documents (Purchase Order (P.O.) / Work Order (W.O.), Inspection Release Note of relevant previous supplies (having cross reference to P.O.), Datasheet, Performance Certificate and any other relevant document deemed necessary of similar supplies of pig signaller which has been successfully commissioned and working for 6 months in last seven(07) years reckoned from the bid due date have to be submitted for prior approval.
10	Documentation (Hard copies / soft copies etc.) to be submitted by Manufacturer is summarized below – Manufacturer shall submit the following documents (in English only): a) General arrangement drawings with overall dimensions and cross-sectional drawings. b) Power consumption details. c) Sectional arrangement drawings showing all parts with reference numbers and material specification including mounting details of pig signallers on the pipeline.

	d) Cable connection details and cable specification. e) Test Certificates. f) Manual for installation, erection instructions, maintenance and operation instructions. g) Manufacturer shall provide standard installation drawing for mounting of sensor on pipe, which should indicate the welding details of the support brackets to the pipe as a minimum.
11	The Pig Signaller shall be clamped to the external surface of the pipe or the scraper trap's major & minor barrel through which the pig passes.

PRESSURE SAFETY VALVES

UNITS : Flow > Liquid - m^3/hr , Gas-Sm^3/day, Steam - kg/hr. Pressure -> kg/cm^2g, Temperature-°C, Level/ Length-> mm

General	01	Tag No.	**PSV-0401,PSV-0701,PSV-0702,PSV-1201**		
	02	Line No./ Size	As per P&ID		
	03	Vessel Protected	**Scrapper Launcher/Receiver (SLR-0401,SRL-0701,SLR-0702,SRL-1201)**		
	04	Quantity	As per P&ID		
	05	Safety/ Relief	Safety Relief		
	06	Vendor	⊕		
Valve	07	Type	Standard		
	08	Full Nozzle Full Lift | Mod. Nozzle	Full Nozzle Full Lift		
	09	Bonnet Type	Closed		
	10	Conv./ Bellows/ Pllot Operated	Conventional		
	11	Inlet Conn. : Size & Rating	⊕		
	12	Inlet Conn. : Facing & Finish	RF,⊕		
	13	Outlet Conn. : Size & Rating	⊕		
	14	Outlet Conn. : Facing & Finish	RF,⊕		
	15	Cap Over Adj. Bolt :	Required		
	16	Screwed | Bolted	Bolted		
	17	Lifting Gear - Type	-		
	18	Test Gag	Required		
Material	19	Body and Bonnet	ASTM A216 Gr. WCB		
	20	Nozzle and Disc	SS 316		
	21	Spring	SS 316		
	22	Bellows			
Options	23	Resilient Seat Seal			
Basis	24	Code	API 520, 521 & 526 (Latest)		
	25	Basis of Selection	Vessel Under Ext. Fire Case		
Service	26	Fluid and State	Natural Gas Vapour/ RLNG		
Conditions	27	Corrosive Constituent	Tot sulphur incl. H2S (max.)-10 PPM(by wt)		
			H2S content (max)- 5PPM (by wt.)		
	28	Corr. Allowance	2 mm		
	29	Required Flow Capacity	⊕		
	30	Mol. Wgt. | S.G. at Rel. Temp.	⊕⊕	⊕⊕	
	31	Oper. Pressure, kg/cm^2g	37-65		
	32	Oper. Temp.°C | Rel. Temp.°C	0-55	⊕	
	33	Valve Discharges to	Atm.		
	34	Back Press. | Const. Or Variable	Atm.	Constant	
	35	Set Pressure, Kg/cm2(g)	92 (Note-7)		
	36	Cold Bench Test Pressure	⊕		
	37	% Over Pressure | % Blow Down	20	⊕	
	38	Cp/Cv | Compressibility Factor	⊕⊕	⊕⊕	
	39	Viscosity at Rel. Temp. (cP)	⊕⊕		
	40	Vessel Wall Temp.,°C | Surf. Area-m^2	593	⊕	
Orifice	41	Calculated Area-$inch^2$	⊕		
	42	Sel. Area-$inch^2$ | Orifice Design	⊕	⊕	
	43	No. of Valves Reqd. for capacity	⊕		
	44	Total Area-$inch^2$	⊕		
	45	Actual Flow Capacity, SCFM	-		
	46	Relief Load	⊕		
	47	Model No.	⊕		
	48	Radiography & Charpy Test	Reqd. (100%)		
	49	IBR Certification	Not Required		

Notes:

⊕ VENDOR TO SPECIFY/ CONFIRM.

⊕⊕ GAS COMPOSITION & OTHER PROPERTIES/DETAILS WILL BE PROVIDED TO SUCESSFUL BIDDER.

1. VENDOR SHALL FURNISH SIZING CALCULATIONS TO SUPPORT HIS VALVE SELECTION.
2. VALVES SHALL BE 100% RADIOGRAPHED.
3. VENDOR TO CONSIDER COEFFICIENT OF DISCHARGE AS PER ASME-SEC-VIII (Latest).
4. FOR SAFETY VALVE SIZING, FURNISH CERTIFIED CAPACITIES AS PER API-520.
5. DESIGNATION, NO. & RATING OF PSV's SHALL BE DECIDED DURING DETAIL ENGINEERING.
6. PSV's SHALL BE SUPPLIED WITH INLET AND OUTLET COMPANION FLANGE.
7. PSV's SET PRESSURE SHALL BE FINALISED DURING DETAILED ENGINEERING.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY
			REVISIONS	

DRG. NO.

SECTION : OIL & GAS

CLIENT :

	NAME	DATE	CHKD	DATE
DSGN				
DRWN				

PROJECT :

MECON LIMITED

APPROVED	**PSV**	DATASHEET NO: Type-1	REV-0

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PRESSURE SAFETY VALVES

UNITS : Flow > Liquid - m^3/hr , Gas-Sm^3/day, Steam - kg/hr. Pressure -> kg/cm^2g, Temperature-°C, Level/ Length-> mm

General	01	Tag No.	**PSV-0101**	**PSV-04A01**
	02	Line No./ Size	As per P&ID	As per P&ID
	03	Vessel Protected	**Scrapper Launcher/Receiver(SLR-0101)**	**Scrapper Launcher/Receiver(SLR-04A01)**
	04	Quantity	As per P&ID	As per P&ID
	05	Safety/ Relief	Safety Relief	Safety Relief
	06	Vendor	♦	♦
Valve	07	Type	Standard	Standard
	08	Full Nozzle Full Lift | Mod. Nozzle	Full Nozzle Full Lift	Full Nozzle Full Lift
	09	Bonnet Type	Closed	Closed
	10	Conv./ Bellows/ Pllot Operated	Conventional	Conventional
	11	Inlet Conn. : Size & Rating	♦	♦
	12	Inlet Conn. : Facing & Finish	RF,♦	RF,♦
	13	Outlet Conn. : Size & Rating	♦	♦
	14	Outlet Conn. : Facing & Finish	RF,♦	RF,♦
	15	Cap Over Adj. Bolt :	Required	Required
	16	Screwed | Bolted	Bolted	Bolted
	17	Lifting Gear - Type	-	-
	18	Test Gag	Required	Required
Material	19	Body and Bonnet	ASTM A216 Gr. WCB	ASTM A216 Gr. WCB
	20	Nozzle and Disc	SS 316	SS 316
	21	Spring	SS 316	SS 316
	22	Bellows		
Options	23	Resilient Seat Seal		
Basis	24	Code	API 520, 521 & 526 (Latest)	API 520, 521 & 526 (Latest)
	25	Basis of Selection	Vessel Under Ext. Fire Case	Vessel Under Ext. Fire Case
Service Conditions	26	Fluid and State	Natural Gas Vapour/ RLNG	Natural Gas Vapour/ RLNG
	27	Corrosive Constituent	Tot sulphur incl. H2S (max.)-10 PPM(by wt)	Tot sulphur incl. H2S (max.)-10 PPM(by wt)
			H2S content (max)- 5PPM (by wt.)	H2S content (max)- 5PPM (by wt.)
	28	Corr. Allowance	2 mm	2 mm
	29	Required Flow Capacity	♦	♦
	30	Mol. Wgt. | S.G. at Rel. Temp.	♦♦ ♦♦	♦♦ ♦♦
	31	Oper. Pressure, kg/cm^2g	55-65	43-50
	32	Oper. Temp.°C | Rel. Temp.°C	0-55 ♦	0-55 ♦
	33	Valve Discharges to	Flare header	Flare header
	34	Back Press. Const. Or Variable	(Note-8) Constant/Variable	0.132 Kg/cm2,g (Note-8) Constant/Variable
	35	Set Pressure, Kg/cm2(g)	-- (Note-7)	-- (Note-7)
	36	Cold Bench Test Pressure	♦	♦
	37	% Over Pressure | % Blow Down	20 ♦	20 ♦
	38	Cp/Cv | Compressibility Factor	♦♦ ♦♦	♦♦ ♦♦
	39	Viscosity at Rel. Temp. (cP)	♦♦	♦♦
	40	Vessel Wall Temp.,°C | Surf. Area-m^2	593 ♦	593 ♦
Orifice	41	Calculated Area-$inch^2$	♦	♦
	42	Sel. Area-$inch^2$ | Orifice Design	♦ ♦	♦ ♦
	43	No. of Valves Reqd. for capacity	♦	♦
	44	Total Area-$inch^2$	♦	♦
	45	Actual Flow Capacity, SCFM	-	-
	46	Relief Load	♦	♦
	47	Model No.	♦	♦
	48	Radiography & Charpy Test	Reqd. (100%)	Reqd. (100%)
	49	IBR Certification	Not Required	Not Required

Notes:

♦ VENDOR TO SPECIFY/ CONFIRM.

♦♦ GAS COMPOSITION & OTHER PROPERTIES/DETAILS WILL BE PROVIDED TO SUCESSFUL BIDDER.

1. VENDOR SHALL FURNISH SIZING CALCULATIONS TO SUPPORT HIS VALVE SELECTION.
2. VALVES SHALL BE 100% RADIOGRAPHED.
3. VENDOR TO CONSIDER COEFFICIENT OF DISCHARGE AS PER ASME-SEC-VIII (Latest).
4. FOR SAFETY VALVE SIZING, FURNISH CERTIFIED CAPACITIES AS PER API-520.
5. DESIGNATION, NO. & RATING OF PSV's SHALL BE DECIDED DURING DETAIL ENGINEERING.
6. PSV's SHALL BE SUPPLIED WITH INLET AND OUTLET COMPANION FLANGE.
7. PSV's SET PRESSURE SHALL BE FINALISED DURING DETAILED ENGINEERING.
8. FLARE HEADER BACK PRESSURE DETAILS WILL BE PROVIDED DURING DETAIL ENGINEERING.

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY
			REVISIONS	

DRG. NO.

SECTION : OIL & GAS

CLIENT :

	NAME	DATE	CHKD	DATE
DSGN				
DRWN				

PROJECT :

MECON LIMITED

APPROVED

PSV

DATASHEET NO: Type-2

REV-0

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DATA SHEET FOR LONG RADIUS BENDS

1)	LR BEND MFR.	
2)	PURCHASER SPECIFICATION NO.	MEC/TS/05/21/015 Rev 0
3)	MANUFACTURING CODE	MSS-SP-75/ ASME B16.49
4)	DIMENSIONAL TESTING	REQUIRED AS PER SPEC.
5)	DESTRUCTIVE TESTING (TENSILE / CHARPY /HARDNESS)	Charpy V-Notch Test required at temp. 0 ^{0}C for set of three transverse specimen. Value shall be Minimum Avg. - 60 J, Individual Minimum - 48 J
		YS: 485 - 605 MPa, TS: 570 - 760 MPa YS/TS = 0.9 Maximum, Elongation - (As per footnote-f of API 5L (20% Minimum)
		Hardness Value shall be 248 HV_{10} Maximum
6)	NON-DESTRUCTUVE TESTING	Required as per Mecon's Technical Specification no. MEC/TS/05/21/012B
7)	PIGGING	Required as per Note-3 below
8)	HYDROSTATIC TEST PRESSURE (For PQT Bend)	170 Kg/cm2 (for 12.7 mm WT) 214 Kg/cm2 (for 15.88 mm WT) 236 Kg/cm2 (for 17.48 mm WT)

Note: All the inspection & tests shall be performed as per Tech. Spec. & QAP attached with the tender.

TABLE-I

Sl. No.	Details of free issue P/L material			Bend Radius (R)	End Type	Qty. (Nos.)	Angle	Straight Length after curvature (mm)
	NB (OD)	Thk. mm	Material					
1.	24" (762 mm)	12.7 mm/ 15.88 mm/ 17.48 mm	API 5L Gr X -70 PSL2	6D*	PE	Note-2		500

*

BE = "D" - denotes nominal dia. of pipe

@ = Bevel End

D = Vendor to indicate

= Straight length after curvature will be minimum 500mm.

Note:

1) Test Bend shall be of 90°
2) Quantity & angles of LR Bends shall be finalized during detailed engineering activities
3) A check shall be performed on each bend by passing gauging pig consisting of two discs of Aluminium/MS Plate having a diameter equal to 95% of the nominal internal diameter of the pipe, connected rigidly together at a distance equal to 500mm. Details of the gauging pig, including its dimensions shall be approved by Purchaser.
4) Out of Roundness shall not exceed 2% of nominal OD
5) Tolerance in Bend Angle shall be ± 0.5° of the specified angle
6) Tolerance in Bend Radius shall be ±1% of the nominal bending radius.
7) Bend off-plane shall be maximum (θ/90) x 10 mm, where θ = Bend angle

REV. NO.					APPRD		
	DATE	ZONE	DESCRIPTIONS	BY		REFERENCES	DRG. NO.
SECTION: OIL&GAS			REVISIONS				
				CLIENT :	IGGL		MECON LIMITED
DSGN	NAME	DATE	CHKD	DATE			
DRWN	Sachin	20.06.2026	Harsh	20.06.2026	PROJECT : DULIAJAN FEEDER LINE PROJECT		
						SCALE :	REV
APPROVED			Pankaj Srivastava Sr. GM		DATA SHEET FOR LONG RADIUS BENDS	DATA SHEET NO.: MEC/E/0085/05/28/M/001/DS-015	0

FLAME ARRESTOR DATASHEET

UNITS: Flow > Liquid - m3/hr , Gas-Sm3/hr, Steam - kg/hr. Pressure -> kg/cm2g, Temperature-°C, Level/ Length-> mm

Sl. No.	Description	Details	Remarks
A	**General Data**		
1.	Tag No.	FA-XX01 & so on (XX-Unit No.)	
2	Make & Model No.	*	
3.	Quantity	As per P&IDs	
4.	Size	8" (As per P&IDs)	
5.	Fluid	Natural Gas (Dry)	
6.	Type.	End of line Deflagration Flame Arrestor	
7.	Burn Type	Short Burn	
8.	Connections/mounting arrangement	Flanged Connection with ANSI B 16.5 WNRF Class 600# with counter flange, fastener and gasket etc.	
9.	Orientation/mounting	Vertically upright	
10.	Direction	One-direction (Venting)	
11.	Construction	Replaceable Element	
12.	Safety Category	Long/Short Burning, Explosion, Detonation & Deflagration proof as per BS 7244:1990	
13.	Warranty	Minimum two years	
14.	Design Standards	API 2000/API RP 2210/ ISO/IEC 80079-49	
15.	Flame Transmission Type Test	Deflagration Flame Arrestor as per BS 7244:1990 Std.	
16.	Flow Rate, Sm^3/hr (Max./Nor.)	*	
17.	Molecular Weight	**	
18.	Gas Group	Class IIA/B	
19.	External Coating	Suitable to corrosive industrial environment/As per painting specification	
20.	L/D ratio	*	Should not exceed 4
B	**Materials**		
1.	Body	Carbon Steel (A420 WPL 6+SA 516 Gr.70)	
2.	Body Flange	A 350 Gr. LF2	
3.	Flame Arrestor Element-Cage	Stainless Steel 316L	
4.	Flame Arrestor Element-Matrix	Stainless Steel 316L	
5.	Bolts & Nuts	Stainless Steel 316	
6.	Wire Mesh & Perforated Sheets	Stainless Steel 316	
7.	Gasket	Spiral Wound SS316-Grafoil filler/corrugated SS316	
8.	Dome (Weather Cowl)	Stainless Steel 316L	
C	**Temperatures**		
1.	Temperature @ Ignition	Ambient	
2.	Design Temperature	-45 deg C to +65 deg C (low temperature carbon steel material)	
3.	Working Temperature	Ambient	
D	**Pressure**		
1.	Max/ Normal Internal Pressure, Kg/cm^2g	*	
2.	Max Pressure Drop through FA Element	<100mmWC	
3.	Pressure Drop through FA Element (Clean Condition)	<50mmWC	
4.	Pressure Drop through FA Element (50% Clogged Condition)	<100mmWC	

Notes:

* VENDOR TO SPECIFY/ CONFIRM.

** GAS COMPOSITION & OTHER PROPERTIES/ DETAILS WILL BE PROVIDED TO SUCESSFUL BIDDER.

1. VENDOR SHALL FURNISH SIZING CALCULATIONS TO SUPPORT THE SELECTION.
2. FLAME ARRESTOR SHALL BE SUITABLE FOR NATURAL GAS SERVICE.
3. FLAME ARRESTOR SHALL BE MAINTENANCE FREE EXCEPT PERIODIC CLEANING.
4. FLAME ARRESTOR ELEMENT SHALL BE REMOVABLE WITHOUT DISMANTLING THE VENT STACK.
5. VENDOR SHALL GUARANTEE FLAME ARRESTING PERFORMANCE FOR THE SPECIFIED GAS GROUP.
6. FLAME ARRESTOR SHALL BE PROVIDED WITH WEATHER HOOD AND DRAIN ARRANGEMENT FOR OUTDOOR INSTALLATION.
7. *IT IS MANUFACTURER's RESPONSIBILITY TO SELECT SUITABLE FLAME ARRESTOR OF PROPER TYPE & DESIGN AS PER APPLICABLE LATEST CODES/STANDARDS (WITH SUITABLE MATERIAL) AS PER THE SYSTEM REQUIREMENT.HOWEVER, FOR ANY CHANGE/DEVIATION, MANUFACTURER SHALL TAKE PRIOR APPROVAL FROM PMC/CLIENT.*

REV. NO.	DATE	ZONE	DESCRIPTIONS	BY	
			REVISIONS		DRG. NO.

SECTION: OIL & GAS (LDP)					CLIENT:	
	NAME	DATE	CHKD	DATE	PROJECT:	MECON LIMITED
DSGN						
DRWN						
APPROVED					FLAME ARRESTOR	DATASHEET NO: REV-0

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DATASHEET FOR RESTRICTED ORIFICE PLATE

UNITS : Flow > Gas - SCMH, Pressure -> kg/cm*^{2}(g), Temperature-°C, Level/ Length-> mm

01	General	Tag No.			RO-XX01 & so on (XX-Unit No.)
02		Line Size			2" & 8" (Upstream) (Refer P&IDs)
03		Line Schedule			Piping Material Specification (PMS)
04		Quantity,Nos.			* (As per calculation & system requirement)
05		Service			Natural Gas (Dry)/RLNG
06		Assembly			Yes -
07	Plate	Required Pressure Drop			*
08		Max. Pr. Loss @ Full Scale, Kg/cm2,g			*
09		Uncertainty, %			*
10		Flow Rate (min), SCMH			* *
11		Flow Rate (max), SCMH			Flow Rate (min) X 1.1
12		Type			Concentric
13		No. Of Plates			*
14		Multi Stage Pressure Reduction			Yes (To make the gas to vent through flare header)
15		Material			SS316
16		Thickness ' W'			*
17		Beta = d/D			*
18		Bore Dig.`d' mm			*
19	Flanges	Vent / Drain	Did. mm		*
20		Centre Distance `R' mm			*
21		Type of Tapping			Flange Type, ASTM A193 Gr. B7/194 Gr. 2H
22		Material			As per ASTM A105
23		Size & Rating			2" & 8" ANSI 600# (Refer P&IDs)
24		Facing & Finish			RF Smooth Finish
25		Line ID mm	OD mm		As per P&ID/Piping Material Specification (PMS)
26		Gasket Thickness			As per AGA3.2 Latest Edition
27		Gasket Material			As per AGA3.2 Latest Edition
28		Plate Holder			*
29		Plate Holder Material			*
30		Stud Material			*
31		Nut Material			*
32	Options	Spool Piece Length			*
33		Connection			Flanged
34		Material			Piping Material Specification (PMS)
35	Service Conditions	Fluid	State		Natural Gas (Dry)/RLNG Gas/Vapour
36		Inlet Pressure (Design Pressure), kg/cm2g			43-50 kg/cm2g (92 kg/cm2g)
37		Outlet Pressure , kg/cm2g			0.132 (flare header back press.,Constant/Variable)
38		Temp. C' (Design)	Min	Max	-45 to 65 Operating Temp. 'C - 0 to 55 (Upstream)
39		SG			* *
40		Steam sp. Vol. M^3/kg			-
41		Mol. Wt.	Cp/ Cv		* * * *
42		Operating Viscosity, cP			* *
43		Compressibility Factor			* *
44		Pipe Reynolds No			*
45		IBR Certification			-

NOTES:

1. * VENDOR TO SPECIFY/ CONFIRM
   ** GAS COMPOSITION AND OTHER PROPERTIES/DETAILS WILL BE PROVIDED TO SUCESSFUL BIDDER DURING DETAIL ENGINEERING.
   # FLARE HEADER BACK PRESSURE WILL BE CONFIRMED DURING DETAIL ENGINEERING.
2. VENDOR SHALL FURNISH SIZING CALCULATIONS TO SUPPORT OF THIS ORIFICE SELECTION DURING DETAILED ENGINEERING.
3. ORIFICE PLATE SHALL BE ENGRAVED WITH TAG NO., LINE DIAMETER, BORE DIAMETER, BETA RATIO AND PLATE MATERIAL ON UPSTREAM SIDE.
4. DELETED
5. ORIFICE FLANGES SHALL BE SUPPLIED ALONG WITH ITS MEASURING FLANGES. THE SAME SHALL BE DESIGNED AS PER ASME B16.36
6. THE DESIGN, CONSTRUCTION, INSTALLATION AND CALIBRATION OF ORIFICE PLATES/FITTINGS SHALL COMPLY TO ISO 5167 LATEST EDITION.
7. MAXIMUM INLET PRESSURE IS CONSIDERED AS PER OPERATING PRESSURE RANGE OF MAINLINE.
8. IT IS MANUFACTURER's RESPONSIBILITY TO SELECT SUITABLE NOs. OF RESTRICTED ORIFICE PLATE OF PROPER TYPE & DESIGN AS PER APPLICABLE CODES/STANDARDS (WITH SUITABLE MATERIAL) AS PER THE SYSTEM REQUIREMENT.HOWEVER, FOR ANY CHANGE/DEVIATION, MANUFACTURER SHALL TAKE PRIOR APPROVAL FROM PMC/CLIENT.

REV. NO.	DATE	DESCRIPTIONS	BY	CHKD	APPRD

SECTION : PROCESS GROUP (OIL & GAS)				CLIENT		MECON LIMITED
	PREP. BY	CHKD	DATE			
NAME				PROJECT		
SIGN						
APPROVED				DATASHEET FOR RESTRICTED ORIFICE PLATE (DT BCPL LEPETKATA)	SCALE :	REV
					DATA SHEET NO.:	0

This document and the design it covers are the property of MECON and issued for the specific project mentioned therein. This is not to be copied or used for other projects unless expressly permitted by MECON.

DATA SHEET FOR SPLIT TEE

DATA SHEET

Sl.No.	DESIGN DATA	
1	Type of Fitting	**24" x 24" Equal Split Tee**
2	ANSI Rating	600#
3	Quantity	As per SOR
4	Design Code	ASME B31.8
5	Design Pressure	99.9 kg/cm^2
6	Design Temperature (°C)	(-)29 to 65
7	Corrosion Allowance (mm)	1.0
8	Design Factor (F)	0.5
9	Flange Facing	NA
10	Flange Finish	NA
11	Branch End	Butt Welding End, BW (MSS-SP-75)
12	PWHT	Yes (in accordance with code) @
13	Field Test Pressure	As per relevant Code ASME B31.8/ Tender Requirements
14 a)	Existing Pipeline Details (on which hot tapping is to be conducted)	Outside Diameter : **24"NB** Thickness : 12.7 mm Material : API 5L Gr. X-70 PSL2
15	Type of Valve to be used on the branch	Full Bore Ball Valve / As per Tender Requirement
16	Product Handled	Natural Gas
17	Sleeve, OD - dia. A(mm)	@
18	Sleeve, Thickness - T1(mm)	@
19	Sleeve, Length - L(mm)	@
20	Branch, OD - dia. B(mm)	@
21	Branch, Thickness - T2(mm)	@
22	Fitting Height (center line of run pipe to flange top) - H(mm)	@
23	Flange, OD - dia. C (mm)	NA
24	Split Tee, Weight (kg)	@
25	**MATERIAL REQUIREMENT**	

Sl. No.	Part Description	Specified Material	Offered Material by Bidder
1	Full Enclirelement Sleeve - Top Portion	MSS-SP-75, Gr. WPHY-70 or equivalent.	@
2	Full Enclirelement Sleeve - Bottom Portion	MSS-SP-75, Gr. WPHY-70 or equivalent.	@
3	Branch	MSS-SP-75, Gr. WPHY-70 or equivalent.	@
4	Lock-O-Ring Flange	N.A	@
5	Lock-O-Ring Assembly with Guide Bars	N.A	@
6	Lock-O-Ring/ Retaining Device	N.A	@

Notes: @ Bidder to indicate

1) Split Tee shall be manufactured, tested and supplied in accordance with Spec. No. MEC/TS/05/21/011A, R0
2) Fittings thickness shall be calculated based on pressure corresponding to ANSI 600# and considering design code, design pressure, design factor and corrosion allowance indicated above. Calculation in this respect shall be submitted by vendor for review/ approval of Purchaser/ Consultant.
3) The fitting shall be capable of withstanding field hydrostatic test pressure indicated above or 90% of SMYS of fitting material which ever is more.
4) Requirement of impact test & hardness as per Specification No. MEC/TS/05/21/011A, R0 shall be applicable for the Fittings & Flange material.
5) Vendor shall submit Inspection & Test Plan and Drawing for approval.

REV. NO.	ZONE	DESCRIPTIONS	BY	APPRD

REVISIONS

REFERENCES DRG. NO.

SECTION OIL & GAS

CLIENT : IGGL

		DATE	CHKD	DATE
DSGN	SACHIN	03.09.2026	HARSH	03.09.2026
DRWN				

PROJECT : Duliajan Feeder Line

MECON LIMITED

Sheet 1 of 1 REV

SCALE : 1

APPROVED PANKAJ SHRIVASTAVA
Sr. GM I/c

EQUAL BRANCH SPLIT TEE (BW)

DATA SHEET NO. : MEC/05/28/M/002/E/0085/DS/ST/011A/01

DATA SHEET FOR MUD MAT

MR Item nos.: 1.1, 1.2

1.0 Mud Mat Manufacturer : Mud Mat Product Name :

2.0 Actual Size of each mat (M x M) Actual Area (in Sqm):

3.0 Useable Size of each mat (M x M) Useable Area (in Sqm):

4.0 MECON's Technical Specification No.

5.0 **Fastener Details:**

5.1 Number of Fasteners per mat:

5.2 Material of Fasteners:

5.3 Dimensions of Each Fasteners:

6 **Mud Mat Material**

	Part	Specified Material	Material Offered (Equivalent or superior)
6.1	Mud Mat	High Density Polyethylene	
6.2	Fasteners	Aluminium/ Stainless Steel Core with composite plastic shell	

7.0 Anti-static : Yes [√] No [ ]

8.0 Anti-slip : Yes [√] No [ ]

9.0 UV resistant : Yes [√] No [ ]

10.0 Anti-absorbent : Yes [√] No [ ]

11.0 Flammability Resistance : UL94HB

12.0 **Testing Requirement**

		Requirement	Remarks
12.1	Compressive Load	**40 Kg/cm2**	
12.2	Tensile Modulus	**>900 MPa**	**ISO 527-1**
12.3	Tensile Stength	**>22 MPa**	**ISO 527-1**
12.4	Elongation at break	**>400%**	**ISO 527-1**
12.5	Shore Hardness	**60-68**	ISO 868
12.6	Temperature of usage	**0 to +65 Deg C**	

Notes:

1. This Data Sheet shall be read in conjunction with MECON's Technical Specification
2. Inspection and Testing shall be as per attached QAP, this Data Sheet, MECON's T.S. and other relevant standards.
3. Bidder shall clearly write mud mat material (equivalent or superior) offered by them against each part/material of mud mat in the space provided for. Wherever bidder agrees with mud mat material as mentioned above in MECON's data sheet, bidder shall clearly indicate **"AGREED".**

13.0 QAPs AND ITPs FOR BOUGHT-OUT ITEMS

(Appendix-III to Particular Job Specification of Work)

QAPs AND ITPs FOR MECHANICAL ITEMS

CONTENTS

A. QAPs

I. LR Bends
II. Scrapper Trap
III. Valves
IV. Actuators
V. Insulating Joint
VI. Flow Tee
VII. Flanges
VIII. Fittings
IX. Warning Mat (Approved QAP)
X. Flame Arrestor
XI. PSV
XII. Fasteners
XIII. Gasket
XIV. Split Tee

B. ITPs

I. Line Pipe
II. Assorted Pipes
III. CS Conduit

CONTRACTOR		**QUALITY ASSURANCE PLAN FOR** STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT : DULIAJAN FEEDER LINE PR
ORDER NO. & DATE			PACKAGE NO. : 05/51/E/0085/IGGL/015
SUB-CONTRACTOR			PACKAGE NAME : **LR BEND**
ORDER NO. & DATE			MR NO. : TS No.: **MEC/TS/05/62/015**

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

MFR : MANUFACTURER
H : HOLD
R : REVIEW
W : WITNESS
RW : RANDOM WITNESS
P : PERFORM

KEY TO SYMBOLS :

* : THIRD PARTY INSPECTION AGENCY APPOINTED BY VENDOR
\# : TEST TO BE PERFORMED, AS APPLICABLE {UT(6*) - HFW/ERW, RT(8*) - LSAW}
** : Sample shall be drawn from intrados, extrados & transition zone of Bend
: Test ring shall be removed from the centre of the Bend & Transiti Zone and test sample shall be drawn from each quadrant during MPQT (Hardness Test for each bend shall be carried out at extrados & intrados of each bend with the help pf portable hardness tester)

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*
1.	Visual
2.	Dimensional
3.	Fitment & Alignment
4.	Physical Test (Sample)
5.	Chemical Test (Sample)
6.	Ultrasonic Test
7.	Magnetic Particle Test (MPI)
8.	Radiography Test
9.	Dye Penetration Test
10.	Metallographic Exam.
11.	Welder's Qualification & Weld Procedure Test
12.	Approval of Test and Repair Procedure
13.	Heat Treatment
14.	Pressure Test
15.	Leakage Test
16.	Balancing
17.	Vibration Test
18.	Amplitude Test
19.	Sponge Test
20.	Dust/ Water Ingress Test
21.	Friction Factor Test
22.	Adhesion Test
23.	Performance Test/Characteristic Curve
24.	No Load/ Free Running Test
25.	Load/ Overload Test
26.	Measurement of Speeds
27.	Accoustical Test
28.	Geometrical Accuracy
29.	Repeatability and Positioning Accuracy
30.	Proving Test
31.	Surface Preparation
32.	Manufacturer's Test Certificates for bought-out items
33.	IBR/ Other Statutory agencies compliance certificate
34.	Internal Inspection Report by Contractor
35.	Hardness Test
36.	Spark Test for Lining
37.	Calibration
38.	Safety Device Test
39.	Ease of Maintenance
40.	Fire Test (Type Test)
41.	Charpy V-Notch Test
42.	Operational Torque Test
43.	ENP (Electroless Nickel Plating) Execution
44.	Painting
45.	Anti-Static Test
46.	Hydrostatic Double Block & Bleed Test
47.	Bend Angle
48.	Pneumatic Double Block & Bleed Test
49.	Proof Test (Type Test)
50.	Dielectric Test
51.	Bending parameter
52.	All Weld Rensile Test
53.	Guided Bend Test of weld

Code	*DOCUMENTS:*
D1.	Approved GA drawings
D2.	Information and other reference drg/ stamped drgs released for mfg.
D3.	Relevant catalogues
D4.	Bill of matl./Item no./ Identification
D5.	Matchmarks details
D6.	Line/ Layout diagram
D7.	Approved erection procedures
D8.	Unpriced sub P.O. with specification and amend-ments, if any
D9.	Calibration Certificate of all measuring instruments and gauges
D10.	X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and	REMARKS/ SAMPLING PLAN
							Manufacturing Procedure Qualification Test (MPQT)			Final Inspection/ Test by					
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (MR Item No.)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	MFR	TPIA*	CLIENT/MECON	MFR	TPIA*	CLIENT/ MECON			
							P	**W**	**W**	**P**	**W**	**RW**			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.0	LR BEND		As per MR/SOR				1, 2, 4**, 5, 6#, 7, 8#, 10, 15, 35##, 41, 47, 51, 52, 53	1, 2, 4**, 5, 6#, 7, 8#, 10, 15, 35##, 41, 47, 51, 52, 53	1, 2, 4**, 5, 6#, 7, 8#, 10, 15, 35##, 41, 47, 51, 52, 53	1, 2, 6#, 7, 8#, 35, 51	1, 2, 6#, 7, 8#, 35, 51	1, 2, 6#, 7, 8#, 35, 51	1, 2, 4, 5, 6#, 7, 8#, 15, 35, 41, 47, 51, 52, 53, D9, D10	D1, D2, MECON's Tech. Spec., Data Sheets & Relevant Standards	100% (As per Technical Specification & Data Sheets of LR Bends)

Special considerations for Bending Parameters during production with respect to MPQT:

1) Forming Temperature shall not vary more than ±25°C.
2) Forming velocity shall not vary more than ±2.5 mm/minute
3) Temperature of cooling water shall not vary more than ±15°C.
4) Flow rate of cooling water shall not vary more than ±10%.
5) Induction Heating frequency shall vary more than ±20%.

Any change in above parameters shall be cause for rejection of that Bend and the cost towards the pipe used for fabrication of that rejected Bend shall be recovered from vendor's account with a rate specified elsewhere in the Tender Document.

Notes:

1. Physical , Chemical, Impact & Hardness Test results shall conform to the requirements of Mecon's Technical Specification for Line Pipe.
2. Manufacturer shall submit marking scheme along with the QAP for approval.
3. Bending parameters established during MPQT shall be maintained for regular production of LR Bends.
4. Visual, Dimensional and other parameters shall be complaint to Technical Specification & Data Sheets, MR & Notes to MR of LR Bends.
5. Any indication observed on MPI shall be verified by MUT.
6. Mettalographic Examination shall be performed in line with the requirements of mother Line Pipe.
7. Bends shall be dispatched with both ends provided with metallic bevel protectors.
8. If results of MPQT does not meet the requirements, vendor shall provide justification and remedial measures and reperform MPQT. Repeated failure of MPQT shall be taken up by the purchaser to initiate suitable action. Cost towards using of additional pipe length for reperforming MPQT shall be recovered from vendor's account with a rate specified elsewhere in the Tender Document.
9. The Bend number shall be placed by cold rolling or low stress dot marking on the outside surface of the Bend at an approximate distance of 50 mmfrom both ends.
10. Bend ends shall be tested by MUT for any lamination at the ends.

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/E/0085/05/21/M/001/QAP-015 REV 0

SHEET **1 OF 1**

	CONTRACTOR		**QUALITY ASSURANCE PLAN FOR** STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT :
	ORDER NO. & DATE			
	SUB-CONTRACTOR			
	ORDER NO. & DATE			ITEM NAME :BI-DIRECTIONAL SCRAPPER TRAP FITTED WITH QOEC AND PIG SIGNALLERS

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

SV : SUB VENDOR
MFR : MANUFACTURER
TPI : THIRD PARTY INSPECTION AGENCY
H : HOLD
R : REVIEW
W : WITNESS

KEY TO SYMBOLS :

** : TEST TO BE PERFORMED, IF APPLICABLE
* : Manufacturer to fill

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*
1.	Visual
2.	Dimensional
3.	Fitment & Alignment
4.	Physical Test (Sample)
5.	Chemical Test (Sample)
6.	Ultrasonic Test
7.	Magnetic Particle Test (MPI)
8.	Radiography Test
9.	Dye Penetration Test
10.	Metallographic Exam.
11.	Welder's Qualification & Weld Procedure Test
12.	Approval of Test and Repair Procedure
13.	Heat Treatment
14.	Pressure Test
15.	Leakage Test
16.	Balancing
17.	Vibration Test
18.	Amplitude Test
19.	Sponge Test
20.	Dust/ Water Ingress Test
21.	Friction Factor Test
22.	Adhesion Test
23.	Performance Test/Characteristic Curve
24.	No Load/ Free Running Test
25.	Load/ Overload Test
26.	Measurement of Speeds
27.	Accoustical Test
28.	Geometrical Accuracy
29.	Repeatability and Positioning Accuracy
30.	Proving Test
31.	Surface Preparation
32.	Manufacturer's Test Certificates for bought-out items
33.	IBR/ Other Statutory agencies compliance certificate
34.	Internal Inspection Report by Contractor
35.	Hardness Test
36.	Spark Test for Lining
37.	Calibration
38.	Safety Device Test
39.	Ease of Maintenance
40.	Fire Test (Type Test)
41.	Charpy V-Notch Test
42.	Operational Torque Test
43.	ENP (Electroless Nickel Plating) Execution
44.	Painting
45.	Anti-Static Test
46.	Hydrostatic Double Block & Bleed Test
47.	Functional Test
48.	Pneumatic Double Block & Bleed Test
49.	Cyclic Test
50.	Pull Through Test
51.	Certification of Jib Crane

Code	*DOCUMENTS:*
D1.	Approved GA drawings
D2.	Information and other reference drg/ stamped drgs released for mfg.
D3.	Relevant catalogues
D4.	Bill of matl./Item no./ Identification
D5.	Matchmarks details
D6.	Line/ Layout diagram
D7.	Approved erection procedures
D8.	Unpriced sub P.O. with specification and amend-ments, if any
D9.	Calibration Certificate of all measuring instruments and gauges
D10.	X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (MR Item No.)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage Inspection			Final Inspection/ Test by					
							MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.0	Scrapper Launcher/Receiver(Bidrectional)	As per P.O.	As per	*	*	*	As per attached sheet 2 to 6								100%

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/WINO/05/28/ M/000/QAP-007

SHEET 1 OF 6

REV **0**

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.0	Raw Material															
1.01	Major Barrel (Body) & Minor Barrel(Neck)	Material As per MR/ Alternate Material accepted			4	4	4	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	H	R	
		by MECON			5	5	5	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					6 **	6 **	6 **	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	7 **	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					35	35	35	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	41	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
1.02	Nozzles, Weldolets/Sockolets, Reducer & Flanges	Material Manufacturer to indicate (to be approved			1,2	1, 2	1, 2	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
		by MECON)			4	4	4	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	5	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					6**	6**	6**	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	7**	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					13	13	13	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	35	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	41	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
1.03	Quick Opening Closure	Material Manufacturer to indicate (to be approved by MECON)			1,2	1,2	1,2	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	4	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	5	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6 **	6 **	6 **	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	7 **	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					13	13	13	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					35	35	35	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	41	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
2.0	In Process Stage Inspection															
2.01	(Check of Lamination, Review/Approval of Procedure, Dimensions, Allignment, Workmanship & Soundness)	Material Manufacturer to indicate (to be approved by MECON)			1,2,3	1,2,3	1,2,3	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					12	12	12	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
2.02	Welding (WPS/PQR/WPQ)	Material As per MR/ Alternate Material accepted by MECON			11	11	11	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
2.03	Heat Treatment				13*	13*	13*				Test Report	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	R	R	
2.04	Radiography				8 **	8 **	8 **	-	-	-	RT Report	1. MECON's T.S. 2. API 1104	H	R	R	100% RT of all butt welds as per cl. 5.1.5 of TS
3.0	Final Inspection															
3.01	Assembled Scrapper trap including QOEC	Material As per MR/ Alternate Material accepted			-	-	-	1,2, 3	1,2, 3	1,2, 3	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	H	W	
					-	-	-	14	14	14	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	W	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					-	-	-	15	15	15	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	W	
					-	-	-	31	31	31	Test Report	1. MECON's T.S.	H	W	R	
								32	32	32	Test Report	1. MECON's T.S.	H	R	R	
					-	-	-	44	44	44	Test Report	1. MECON's T.S.	H	W	W/R	
					-	-	-	47	47	47	Test Report	1. MECON's T.S.	H	H	W	functioning of pig signaller shall also be verified.
					-	-	-	50	50	50	Test Report	1. MECON's T.S.	H	H	W	
								37	37	37	Calibration	1. D9 2. Relevant Calibration T.C.	H	R	R	
								49	49	49	1. Test Report 2. Relevant Calibration T.C. 3. Relevant Certification	1. D9 2. MECON's T.S. 3. Notes to MR	H	H	W	
								51	51	51	1. Test Report 2. Relevant Calibration T.C. 3. Relevant Certification	1. D9 2. MECON's T.S. 3. Spark proof contraction	H	R	R	
1.10	Final Documentation Check, Verification of TC & Compilation of Inspection Reports				-	-	-	√	√	√	1. Final Report 2. Final Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	-	
1.11	Complete and compiled document check and Despatch Clearance				-	-	-	√	√	√	1. Final Report 2. Final Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	-	H	

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR

MECON मेकॉन ISO 9001 Company	CONTRACTOR		**QUALITY ASSURANCE PLAN FOR** STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT :
	ORDER NO. & DATE			PACKAGE NO.:
	SUB-CONTRACTOR			PACKAGE NAME : VALVES
	ORDER NO. & DATE			

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

SV : SUB VENDOR
MFR : MANUFACTURER
TPI : DESIGNATED THIRD PARTY INSPECTION AGENCY
H : HOLD
R : REVIEW
W : WITNESS
V : Verification

KEY TO SYMBOLS :

* : TO BE FILLED BY VENDOR
** : TEST TO BE PERFORMED, IF APPLICABLE

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*
1.	Visual
2.	Dimensional
3.	Fitment & Alignment
4.	Physical Test (Sample)
5.	Chemical Test (Sample)
6.	Ultrasonic Test
7.	Magnetic Particle Test (MPI)
8.	Radiography Test
9.	Dye Penetration Test
10.	Metallographic Exam.
11.	Welder's Qualification & Weld Procedure Test
12.	Approval of Test and Repair Procedure
13.	Heat Treatment
14.	Pressure Test
15.	Leakage Test
16.	Balancing
17.	Vibration Test
18.	Amplitude Test
19.	Sponge Test
20.	Dust/ Water Ingress Test
21.	Friction Factor Test
22.	Adhesion Test

Code	*Description*
23.	Performance Test/Characteristic Curve
24.	No Load/ Free Running Test
25.	Load/ Overload Test
26.	Measurement of Speeds
27.	Accoustical Test
28.	Geometrical Accuracy
29.	Repeatability and Positioning Accuracy
30.	Proving Test
31.	Surface Preparation
32.	Manufacturer's Test Certificates for bought-out items
33.	IBR/ Other Statutory agencies compliance certificate
31.	Surface Preparation
32.	Manufacturer's Test Certificates for bought-out items
33.	IBR/ Other Statutory agencies compliance certificate
34.	Internal Inspection Report
35.	Hardness Test
36.	Spark Test for Lining
37.	Calibration

Code	*Description*
38.	Safety Device Test
39.	Ease of Maintenance
40.	Fire Test (Type Test)
41.	Charpy V-Notch Test
42.	Operational Torque Test
43.	ENP (Electroless Nickel Plating) Execution
44.	Painting
45.	Anti-Static Test
46.	Hydrostatic DBB/DIB-1/DIB-2
47.	Functional Test
48.	Pneumatic DBB/DIB-1/DIB-2
49.	Cyclic Test
50.	Strip test
51.	Sealant injection testing
52.	Cavity Relief Testing
53.	Low Pressure Pneumatic Seat Test
54.	Backseat Pressure Testing
55.	Vacuum Testing
56.	Drive Train Strength Test
57.	High Pressure Gas Shell test
58.	PMI Test
59.	High-pressure Gas Seat Test

Code	*DOCUMENTS:*
D1.	Approved GA drawings
D2.	Information and other reference drg/ stamped drgs released for mfg.
D3.	Relevant catalogues
D4.	Bill of matl./Item no./ Identification
D5.	Matchmarks details
D6.	Line/ Layout diagram
D7.	Approved erection procedures
D8.	Unpriced sub P.O. with specification and amend-ments, if any
D9.	Calibration Certificate of all measuring instruments and gauges
D10.	X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (Schedule No.)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage Inspection			Final Inspection/ Test by					
							MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.0	Valves		*		*	*	As per attached sheet 2 to 10								

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/WINO/05/28/M/001/QAP-002A

REV **0**

SHEET 1 OF 9

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.01	Body	Material As per MR/ Alternate Material accepted by MECON			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6 **	6 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8 **	8 **	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
	LPT for seat pocket area				9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
1.02	Closure/ Body Adapter/ Tail Piece	Material Manufacturer to indicate (to be approved by MECON)			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
	LPT for seat pocket area				9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
1.03	Top Cover/Bottom Cover/Cover or Any other pressure-containing part	Material Manufacturer to indicate (to be approved by MECON)			1,2	-	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6 **	6 **	-	-	-	-	Test Report	1. ASME B16.34, Annex-E 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	-	-	-	-	Test Report	1. ASME B16.34, Annex-C 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8 **	8 **	-	-	-	-	Test Report	1. ASME B16.34 Annex-B 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	R	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	R	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.04	Trunnion if applicable (for Trunnion Mounted Valves)	Material Manufacturer to indicate (to be approved by MECON)			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					43 **	43 **	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	Thickness, Hardness of ENP / STELLITE/ other coating / overlay etc. ENP Coating must comply to ASTM B 733 , Classification: SC4 , Type-V
1.05	Ball/Plug/Disc	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	Thickness, Hardness of ENP / STELLITE/ other coating / overlay etc. ENP Coating must comply to ASTM B 733 , Classification: SC4 , Type-V
1.06	Stem , Stem Holder, Stem Extension	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	Thickness, Hardness of ENP / STELLITE/ other coating / overlay etc. ENP Coating must comply to ASTM B 733 , Classification: SC4 , Type-V
1.07	Seats	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					43	43	-	-	-	-	1. Test Report 2. Material Test Certificates for composition, hardness, thickness & integrity	1. MECON's T.S. 2. MECON's D.S. 3. ASTM B733 Std. 4. Manufacturer's Specification	H	H	R	Thickness, Hardness of ENP / STELLITE/ other coating / overlay etc. ENP Coating must comply to ASTM B 733 , Classification: SC4 , Type-V
1.01	PUP PIECE	Material As per MR/ Alternate Material accepted			4	4	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					6 **	6 **	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	-	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					35	35	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.08	Bolting Material (Studs & Nuts)	Material As per MR/ Alternate Material accepted by MECON			1,2	1,2	-	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	Alongwith thickness measurement for ENP Coating.
					4	4	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6**	6**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					8**	8**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	W	R	All castings as per clause 5.1.4 b) of T.S., all welds, weld ends of all cast valves
					9**	9**	-	-	-	-	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	Bevel Surfaces (by MPI/ DP)
					13	13	-	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					41	41	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					58	58	-	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	For Stainless Steel / Alloy steel material
1.09	Body to Body Adapter/Side Piece Welding							6**	6**	6**	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	H	R	For welded body ball valves
1.10	Body/Body Adapter/Side Piece to Pup Piece Welding							7**	7**	7**	Test Report	1. ASME B16.34, Appendix-II 2. MECON's T.S.	H	W	R	For valves with Pup Piece
								8**	8**	8**	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	R	R	
								9**	9**	9**	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	
1.11	Bevel of butt weld							6**	6**	6**	Test Report	1. ASME B16.34, Appendix-IV 2. MECON's T.S.	H	W	R	For lamination type defects for a distance of 50mm from the weld end

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
								8**	8**	8**	Test Report	1. ASME B16.34, Appendix-I 2. MECON's T.S.	H	R	R	For cast weld end
								9**	9**	9**	Test Report	1. ASME B16.34, Appendix-III 2. MECON's T.S.	H	W	R	All defects longer than 6.35 mm are rejected, as are defects between 6.35 mm and 1.59mm that are separated by a distance less than 50 times their greatest length.
1.13	Pressure Relief/Safety Valve in DIB-1 Valves							-	-	-	1. Material Test Certificates 2. Test Reports	1. MECON's T.S. 2. API 6D Std. cl 10.5 3. Approved Grg.	H	R	R	FOR DIB-1 TMBV VALVES ONLY
1.14	Gear Box							-	-	-	1. Material Test Certificates 2. Test Reports	1. MECON's T.S. 2. MECON's D.S. 3. Approved Datasheet / Approved GA drgs.	H	R	R	Where Gear Box is provided
1.15	Soft Sealing Material (O-ring/packing/soft seat etc.)							-	-	-	1. Material Test Certificates 2. Test Reports	1. MECON's T.S. 2. MECON's D.S.	H	R	R	
1.17	Assembled Valves				-	-	-	1,2	1,2	1,2	Report	1. D1 2. MECON's T.S.	H	H	W	
					-	-	-	3	3	3	Report		H	H	W	
					-	-	-	14	14	14	1. Report 2. Test Certificates	1. D1 2. MECON's T.S. 3. MECON's D.S. 4. API 6D Std./ BS EN 12266 (as applicable) 5. MECON's Note to MR	H	H	W	As per Datasheet For Natural Gas Service :Test duration shall be twice that of the value specified in Table of API 6D.
					-	-	-	15	15	15	1. Report 2. Test Certificates	1. D1 2. MECON's T.S. 3. MECON's D.S. 4. API 6D Std./ BS EN 12266 (as applicable) 5. MECON's Note to MR	H	H	W	As per Datasheet For Natural Gas Service :Test duration shall be twice that of the value specified in Table of API 6D.
								40	40	40	1. Report 2. Test Certificates	1. API 607/ API 6FA / BS EN ISO 10497 (as applicable) 2. MECON's T.S. 3. MECON's D.S.	R	R	R	
								42	42	42	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. API 6D Std. (as applicable)	H	H	W	For Manual Valves
					-	-	-	37	37	37	Certificates		-	R	R	
					-	-	-	44	44	44	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. Manufacturer's Specification	H	W	R / W	
					-	-	-	45	45	45	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	W	
					-	-	-	46	46	46	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. (as applicable)	H	H	W	Applicable for Trunnion Mounted Ball Valves For Natural Gas Service :Test duration shall be twice that of the value specified in Table of API 6D.

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					-	-	-	47	47	47	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	W	For actuated valves. At least five Open-Close-Open cycles without internal pressure and five Open-Close-Open cycles with maximum differential pressure shall be performed on the valve actuator assembly. The time for Full Open to Full close shall be recorded during testing. Hand operator provided on the actuator shall also be checked after above testing
					-	-	-	48	48	48	1. Report 2. Test Certificates	1. MECON's T.S. 2. API 6D Std. (as applicable)	H	H	W	Applicable for Trunnion Mounted Ball Valves For Natural Gas Service :Test duration shall be twice that of the value specified in Table of API 6D.
					-	-	-	49	49	49	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S.	H	H	W	For Ball Valves as per Cl 5.1.13 of TS of ball valves. The valve selected for cyclic test shall subsequently undergo sealant injection test and strip down test in the same order.
					-	-	-	50	50	50	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S.	H	H	W	Refer cl 21.0 of notes to MR .The valve selected for cyclic test shall be subsequently undergo sealant injection test .
					-	-	-	51	51	51	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S.	H	H	W	For Ball and Plug Valves .The valve selected for cyclic test shall be subsequently undergo strip
					-	-	-	52	52	52	1. Report 2. Test Certificates	1. API Anex I.7 2. MECON's T.S.	H	H	W	For DIB and DBB Ball Valves
					-	-	-	53	53	53	1. Report 2. Test Certificates	1. MECON's D.S. 2. MECON's T.S 3. API 6D Std. - Type-1	H	H	W	API 6D Valves - Type 1 - Pressure between 0.34 barg and 1 barg
					-	-	-	54	54	54	1. Report 2. Test Certificates	1. MECON's D.S. 2. MECON's T.S.	H	H	W	For Gate and Globe valves
					-	-	-	55	55	55	1. Report 2. Test Certificates	1. MECON's D.S. 2. MECON's T.S.	H	H	R	For Ball / Plug Valves. One valve per size per rating
					-	-	-	56	56	56	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. API 6D Std.	H	H	R	For Ball, Gate ,Plug valves
					-	-	-	57	57	57	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. API 6D Std.	H	H	W	
					-	-	-	59	59	59	1. Report 2. Test Certificates	1. MECON's T.S. 2. MECON's D.S. 3. API 6D Std.	H	H	W	
1.18	Complete documentation check and compilation							-	-	-	1. Final Report 2. Final Certificates	1. MECON's T.S. 2. API 6D Std. / BS EN ISO 17292 (as applicable)	H	H	-	
1.19	Verification of Spares				-	-	-	-	-	-	1. Final Report 2. Final Certificates	1. Commissioning Spares List 2.Mandatory Spares List 3.List of Special Tools and Tackles 4. Any other Spare / Tool/Tackles list	H	V	V	Packaging list shall include details of spares including commissioning spares like sealant, sealant gun, where part of P.O. with make, model, quantity along with photographs of the same.
1.20	Packaging of Valves				-	-	-	-	-	-	1. Final Report 2. Final Certificates	1. MECON's D.S. 2. MECON's T.S.	H	W	R	TPIA shall add photos with their report / IRN. On packages, the following shall be marked legibly with suitable marking ink: a) Order Number b) Manufacturer's Name c) Valve Size and Rating d) Tag Number e) Serial Number
1.21	Complete and compiled documentation check and dispatch clearance				-	-	-	-	-	-	1. Final Report 2. Final Certificates	1. MECON's T.S. 2. Packaging List 3. Approved GA drgs.	H	IRN	H	
1.22	Actuator Tests (If Applicable)				**As per Actuator Quality Assurance Plan (to be submitted by vendor for approval)**											

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR

	CONTRACTOR		QUALITY ASSURANCE PLAN FOR INSTRUMENTATION EQUIPMENT	PROJECT :
	ORDER NO. & DATE			PACKAGE NO. :
	SUB-CONTRACTOR			PACKAGE NAME :
	ORDER NO. & DATE			ITEM NAME : GAS POWERED ACTUATOR

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
H : HOLD
R : REVIEW
W : WITNESS
P : PERFORM

KEY TO SYMBOLS :

* : MFR/ CONTRACTOR - AS APPLICABLE
** : TEST TO BE PERFORMED, IF APPLICABLE

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS

Code	Description	Code	Description	Code	Description	Code	DOCUMENTS:
1.	Visual	18.	Amplitude Test	34.	Internal Inspection Report by Contractor	D1.	Approved GA drawings
2.	Dimensional	19.	Sponge Test			D2.	Information and other reference drg/ stamped drgs released for mfg.
3.	Fitment & Alignment	20.	Dust/ Water Ingress Test	35.	Hardness Test		
4.	Physical Test (Sample)	21.	Friction Factor Test	36.	Spark Test for Lining		
5.	Chemical Test (Sample)	22.	Adhesion Test	37.	Calibration	D3.	Relevant catalogues
6.	Ultrasonic Test	23.	Performance Test/Characteristic Curve	38.	Safety Device Test	D4.	Bill of matl./Item no./ Identification
7.	Magnetic Particle Test (MPI)			39.	Ease of Maintenance		
8.	Radiography Test	24.	No Load/ Free Running Test	40.	Fire Test (Type Test)	D5.	Matchmarks details
9.	Dye Penetration Test	25.	Load/ Overload Test	41.	Charpy V-Notch Test	D6.	Line/ Layout diagram
10.	Metallographic Exam.	26.	Measurement of Speeds	42.	Operational Torque Test	D7.	Approved erection procedures
11.	Welder's Qualification & Weld Procedure Test	27.	Accoustical Test	43.	ENP (Electroless Nickel Plating) Execution	D8.	Unpriced sub P.O. with specification and amend-ments, if any
		28.	Geometrical Accuracy				
12.	Approval of Test and Repair Procedure	29.	Repeatability and Positioning Accuracy	44.	Painting		
				45.	Anti-Static Test		
13.	Heat Treatment	30.	Proving Test	46.	Hydrostatic Double Block & Bleed Test	D9.	Calibration Certificate of all measuring instruments
14.	Pressure Test	31.	Surface Preparation				
15.	Leakage Test a) Piston Seal b) Pneumatic Connection			47.	Functional Test : a) Electrical and pneumatic functional test. b) Insulation Test of Electrical components. c) Check of operating time control. d) Check of limiting device operation. e) No load test (DP=0) & load (DP max) Operations with the minimum required feeding pressure. f) Manual Override functional test.		
		32.	Manufacturer's Test Certificates and gauges				
16.	Balancing		for bought-out items	48.	Pneumatic Double Block & Bleed Test	D10.	X-Ray Reports
17.	Vibration Test	33.	IBR/ Other Statutory agencies compliance certificate				

Sl. No.	EQUIPMENT DETAILS: Description (with equipment heading, place of use and brief specifications)	Identification No. (As per MR)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	INSPECTION AND TESTS: Raw Material and In-Process Stage Inspection MFR		TPI		MECON	Final Inspection/ Test by MFR		TPI		MECON		Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
1	2	3	4	5	6	7	8		9		10	11		12		13		14	15	16
	GAS POWERED ACTUATOR		As per PO	-			5,6/7/8/9*,14,15(a),42,23	P	6/7/8/9*, 14,15(a), 42,23	W#	-	1,2,3,15(b),31,44,47	P	1,2,3,15(b),44,47	W	1,2,3,15(b),44,47	R	1,2,3,5,6,7,8,9,14,15(a),15(b),23	D2,D3,D4,D6, MECON TS	100%
									5	R		32,33	R	31,32,33	R	31,32,33	R	31,32,33,42,44,47		

*Tests as applicable shall be carried out on storage tank & actuator cylinder.
#Tests shall be witnessed for storage tank & actuator cylinder.
NOTE :- 3.2 Inspection Report shall be provided.

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/05/E5/STD./QAP/AV REV 0

SHEET 1 OF 1

CONTRACTOR		QUALITY ASSURANCE PLAN FOR INSTRUMENTATION EQUIPMENT	PROJECT :	
ORDER NO. & DATE			PACKAGE NO. :	
SUB-CONTRACTOR			PACKAGE NAME :	
ORDER NO. & DATE			ITEM NAME : HYDRAULIC ACTUATOR	

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
H : HOLD
R : REVIEW
W : WITNESS
P : PERFORM

KEY TO SYMBOLS :

* : MFR/ CONTRACTOR - AS APPLICABLE
** : TEST TO BE PERFORMED, IF APPLICABLE

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	Description	Code	Description	Code	Description	Code	DOCUMENTS:
1.	Visual	18.	Amplitude Test	34.	Internal Inspection Report by Contractor	D1.	Approved GA drawings
2.	Dimensional	19.	Sponge Test	35.	Hardness Test	D2.	Information and other reference drg/ stamped drgs released for mfg.
3.	Fitment & Alignment	20.	Dust/ Water Ingress Test	36.	Spark Test for Lining	D3.	Relevant catalogues
4.	Physical Test (Sample)	21.	Friction Factor Test	37.	Calibration	D4.	Bill of matl./Item no./ Identification
5.	Chemical Test (Sample)	22.	Adhesion Test	38.	Safety Device Test	D5.	Matchmarks details
6.	Ultrasonic Test	23.	Performance Test/Characteristic Curve	39.	Ease of Maintenance	D6.	Line/ Layout diagram
7.	Magnetic Particle Test (MPI)	24.	No Load/ Free Running Test	40.	Fire Test (Type Test)	D7.	Approved erection procedures
8.	Radiography Test	25.	Load/ Overload Test	41.	Charpy V-Notch Test	D8.	Unpriced sub P.O. with specification and amend-ments, if any
9.	Dye Penetration Test	26.	Measurement of Speeds	42.	Operational Torque Test	D9.	Calibration Certificate of all measuring instruments and gauges
10.	Metallographic Exam.	27.	Accoustical Test	43.	ENP (Electroless Nickel Plating) Execution	D10.	X-Ray Reports
11.	Welder's Qualification & Weld Procedure Test	28.	Geometrical Accuracy	44.	Painting		
12.	Approval of Test and Repair Procedure	29.	Repeatability and Positioning Accuracy	45.	Anti-Static Test		
13.	Heat Treatment	30.	Proving Test	46.	Hydrostatic Double Block & Bleed Test		
14.	Pressure Test	31.	Surface Preparation	47.	Functional Test : a) Electrical functional test. b) Check of limiting device operation. c) No load test (DP=0) & load (DP max) Operations.		
15.	Leakage Test a) Piston Seal b) Hydraulic Connection	32.	Manufacturer's Test Certificates for bought-out items	48.	Pneumatic Double Block & Bleed Test		
16.	Balancing	33.	IBR/ Other Statutory agencies compliance certificate				
17.	Vibration Test						

EQUIPMENT DETAILS							INSPECTION AND TESTS										Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
							Raw Material and In-Process Stage Inspection						Final Inspection/ Test by							
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (As per MR)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	MFR		TPI		MECON		MFR		TPI		MECON				
1	2	3	4	5	6	7	8		9		10		11		12		13		14	15	16
	HYDRAULIC ACTUATOR		As per PO	-			5,6/7/8/9*, 14,15(a),42,23	P	6/7/8/9*, 14,15(a), 42,23	W#	-		1,2,3,15(b),31,44,47	P	1,2,3,15(b),44,47	W	1,2,3,15(b),44,47	R	1,2,3,5,6,7,8,9,14,15(a),15(b),23	D2,D3,D4,D6, MECON TS	100%
									5	R			32,33	R	31,32,33	R	31,32,33	R	31,32,33,42,44,47		

*Tests as applicable shall be carried out on actuator cylinder.
#Tests shall be witnessed for actuator cylinder.
NOTE :- 3.2 Inspection Report shall be provided.

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/05/E5/STD./QAP/HOV REV 0

SHEET 1 OF 1

	CONTRACTOR		**QUALITY ASSURANCE PLAN FOR** STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT :
	ORDER NO. & DATE			
	SUB-CONTRACTOR			
	ORDER NO. & DATE			ITEM NAME :BI-DIRECTIONAL SCRAPPER TRAP FITTED WITH QOEC AND PIG SIGNALLERS

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

SV : SUB VENDOR
MFR : MANUFACTURER
TPI : THIRD PARTY INSPECTION AGENCY
H : HOLD
R : REVIEW
W : WITNESS

KEY TO SYMBOLS :

** : TEST TO BE PERFORMED, IF APPLICABLE
* : Manufacturer to fill

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code Description

1. Visual
2. Dimensional
3. Fitment & Alignment
4. Physical Test (Sample)
5. Chemical Test (Sample)
6. Ultrasonic Test
7. Magnetic Particle Test (MPI)
8. Radiography Test
9. Dye Penetration Test
10. Metallographic Exam.
11. Welder's Qualification & Weld Procedure Test
12. Approval of Test and Repair Procedure
13. Heat Treatment
14. Pressure Test
15. Leakage Test
16. Balancing
17. Vibration Test
18. Amplitude Test
19. Sponge Test
20. Dust/ Water Ingress Test
21. Friction Factor Test
22. Adhesion Test
23. Performance Test/Characteristic Curve
24. No Load/ Free Running Test
25. Load/ Overload Test
26. Measurement of Speeds
27. Accoustical Test
28. Geometrical Accuracy
29. Repeatability and Positioning Accuracy
30. Proving Test
31. Surface Preparation
32. Manufacturer's Test Certificates for bought-out items
33. IBR/ Other Statutory agencies compliance certificate
34. Internal Inspection Report by Contractor
35. Hardness Test
36. Spark Test for Lining
37. Calibration
38. Safety Device Test
39. Ease of Maintenance
40. Fire Test (Type Test)
41. Charpy V-Notch Test
42. Operational Torque Test
43. ENP (Electroless Nickel Plating) Execution
44. Painting
45. Anti-Static Test
46. Hydrostatic Double Block & Bleed Test
47. Functional Test
48. Pneumatic Double Block & Bleed Test
49. Cyclic Test
50. Pull Through Test
51. Certification of Jib Crane

Code DOCUMENTS:

D1. Approved GA drawings
D2. Information and other reference drg/ stamped drgs released for mfg.
D3. Relevant catalogues
D4. Bill of matl./Item no./ Identification
D5. Matchmarks details
D6. Line/ Layout diagram
D7. Approved erection procedures
D8. Unpriced sub P.O. with specification and amend-ments, if any
D9. Calibration Certificate of all measuring instruments and gauges
D10. X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS								
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (MR Item No.)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage Inspection			Final Inspection/ Test by			Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
							MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.0	Scrapper Launcher/Receiver(Bidirectional)	As per P.O.	As per	*	*	*	As per attached sheet 2 to 6								100%

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/WINO/05/28/ M/000/QAP-007
SHEET 1 OF 6

REV **0**

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
1.0	Raw Material															
1.01	Major Barrel (Body) & Minor Barrel(Neck)	Material As per MR/ Alternate Material accepted			4	4	4	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	H	R	
		by MECON			5	5	5	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					6 **	6 **	6 **	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	7 **	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					35	35	35	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	41	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
1.02	Nozzles, Weldolets/Sockolets, Reducer & Flanges	Material Manufacturer to indicate (to be approved			1,2	1, 2	1, 2	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
		by MECON)			4	4	4	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	5	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					6**	6**	6**	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7**	7**	7**	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					13	13	13	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	
					35	35	35	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	41	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
1.03	Quick Opening Closure	Material Manufacturer to indicate (to be approved by MECON)			1,2	1,2	1,2	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					4	4	4	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
					5	5	5	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					6 **	6 **	6 **	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Forgings, welds, wrought weld ends
					7 **	7 **	7 **	-	-	-	Test Report	1. MECON's T.S.	H	W	R	Wet MPI for 100% of internal surfaces of all castings & forgings & bevel surfaces (MPI/ DP)
					13	13	13	-	-	-	Report/ Material Test Certificates	1. Relevant Material Standard	H	R	R	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					35	35	35	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
					41	41	41	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	R	
2.0	In Process Stage Inspection															
2.01	(Check of Lamination, Review/Approval of Procedure, Dimensions, Allignment, Workmanship & Soundness)	Material Manufacturer to indicate (to be approved by MECON)			1,2,3	1,2,3	1,2,3	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
					12	12	12	-	-	-	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	R	
2.02	Welding (WPS/PQR/WPQ)	Material As per MR/ Alternate Material accepted by MECON			11	11	11	-	-	-	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	R	R	
2.03	Heat Treatment				13*	13*	13*				Test Report	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	R	R	
2.04	Radiography				8 **	8 **	8 **	-	-	-	RT Report	1. MECON's T.S. 2. API 1104	H	R	R	100% RT of all butt welds as per cl. 5.1.5 of TS
3.0	Final Inspection															
3.01	Assembled Scrapper trap including QOEC	Material As per MR/ Alternate Material accepted			-	-	-	1,2, 3	1,2, 3	1,2, 3	1. D1 2. Report	1. D1 2. Relevant Material Standard 3. Manufacturer's Specification	H	H	W	
					-	-	-	14	14	14	Material Test Certificates	1. Relevant Material Standard 2. MECON's D.S.	H	H	W	

EQUIPMENT DETAILS					INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	Inspection Codes & Sampling Plan			REMARKS
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Raw Material and In-Process stage inspection			Final Inspection/ Test by								
					MFR/SV	TPI	MECON	MFR/SV	TPI	MECON			MFR/SV	TPI	MECON	
1	2	3	4	5	8	9	10	11	12	13	14	15	16A	16B	16C	
					-	-	-	15	15	15	Material Test Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	W	
					-	-	-	31	31	31	Test Report	1. MECON's T.S.	H	W	R	
								32	32	32	Test Report	1. MECON's T.S.	H	R	R	
					-	-	-	44	44	44	Test Report	1. MECON's T.S.	H	W	W/R	
					-	-	-	47	47	47	Test Report	1. MECON's T.S.	H	H	W	functioning of pig signaller shall also be verified.
					-	-	-	50	50	50	Test Report	1. MECON's T.S.	H	H	W	
								37	37	37	Calibration	1. D9 2. Relevant Calibration T.C.	H	R	R	
								49	49	49	1. Test Report 2. Relevant Calibration T.C. 3. Relevant Certification	1. D9 2. MECON's T.S. 3. Notes to MR	H	H	W	
								51	51	51	1. Test Report 2. Relevant Calibration T.C. 3. Relevant Certification	1. D9 2. MECON's T.S. 3. Spark proof contraction	H	R	R	
1.10	Final Documentation Check, Verification of TC & Compilation of Inspection Reports				-	-	-	√	√	√	1. Final Report 2. Final Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	H	-	
1.11	Complete and compiled document check and Despatch Clearance				-	-	-	√	√	√	1. Final Report 2. Final Certificates	1. Relevant Material Standard 2. MECON's T.S. 3. MECON's D.S.	H	-	H	

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR

QAP NO.: MEC/[E/0077 & E/0079]/05/28/M/000/QAP-007 REV **0**

QUALITY ASSURANCE PLAN FOR INSULATING JOINTS

Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by
0	04.07.2026	ISSUED FOR IMPLEMENTATION	CSV	AM	HK

Format No. : 05/21/IJ/001

	QUALITY ASSURANCE PLAN FOR INSULATING JOINTS	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0077/05/21/000/M/IJ/QAP-009** **SPECIFICATIONS: MEC/TS/05/21/009**

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/009, R-0 WITH AMENDMENTS									**SCOPE OF INSPECTION**		
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor**	**TPIA**	**MECON /CLIENT**
1.	Raw Material Identification	Forged Ring, Pipe	1. Visual 2. Dimensions 3. Finish 4. Bore 5. Marking 6. Mechanical properties (Tensile, Impact, Hardness and others) 7. Chemical properties (CE Value) 8. Supply Condition (Heat treatment). 9. Deoxidation practice / refining (killed / calcium treated / vacuum degassed etc.) (as per applicable spec.)	Visual Dimensions Verification of markings with TC, TC verification	100%	Material Specification	Technical Specification as per TS and Data Sheet	Mill, Manufacturer's TC	P	W	R
2.	Raw Material Identification	Seal Gasket, Filling Material Insulating Ring	Electrical Test	Electrical Resistance/ Di-electric Test	100%	Material Specification / Data Sheet/Notes To MR	Technical Specification as per TS and Data Sheet	Inspection Report	P	W	R
			Physical Testing, Thickness & Compressive Strength Test	Lab testing							
3.	Manufacturing Welding	-	Approved WPS, PQR, WQT	Welding Parameters	100%	ASME Section-IX	ASME Section IX	WPS, PQR, WPS	P	Review of existing	R

	QUALITY ASSURANCE PLAN FOR INSULATING JOINTS	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0077/05/21/000/M/IJ/QAP-009** **SPECIFICATIONS: MEC/TS/05/21/009**

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/009, R-0 WITH AMENDMENTS									**SCOPE OF INSPECTION**		
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor**	**TPIA**	**MECON /CLIENT**
4.	Manufacturing Welding	-	New WPS, PQR, WQT	Welding Parameters	100%	ASME Section-IX	ASME Section IX	WPS, PQR, WPS	P	WPS/PQR/WQR by TPIA if suitable, In the non suitability of established WPS/PQR shall be witness by TPIA	R
5.	Manufacturing Welding	Forged Ring to pipe (Butt & Fillet)	Welding	Welding Parameters	At random	Approved WPS	Approved WPS	Inspection Report	P	R	R
6.	Non Destructive Testing	Pipe to Ring (Other than butt welds) Forgings (surface), Finished weld ends for lamination, Fillet welds greater 7 mm	Surface & Internal Imperfections	UT, MPI or other as specified	PO, Material Specification	PO, Material Specification	PO, Technical Specification	Inspection Report, Graphical record	P	W	R
7.	Non Destructive Testing	Pipe to Ring (Butt Welds & Repairs)	Surface & Internal Imperfections	Radiography	PO, Material Specification	API-1104 ASME SEC V	API-1104 PO, Technical Specification	Inspection Report Film	P	R (100% of films)	R

	QUALITY ASSURANCE PLAN FOR INSULATING JOINTS	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0077/05/21/000/M/IJ/QAP-009** **SPECIFICATIONS: MEC/TS/05/21/009**

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/009, R-0 WITH AMENDMENTS									**SCOPE OF INSPECTION**		
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor**	**TPIA**	**MECON /CLIENT**
8.	Hydro testing Air Leak Test, Vacuum Test	Insulating Joint Assembly	Leak Check	Visual	100%	Material Specification	Technical Specification and relevant standards mentioned therein.	Inspection Report, Hydro graph	P	W	W
\9.	Final Inspection	Pipe	Surface condition, Bevel angle, Root face, Outer dia., Thickness Length, End finish, Coating,	Visual Dimensional	100% by vendor, at random by MECON / TPI	Material Specification	Technical Specification and relevant standards mentioned therein	Inspection Report	P	W	W
10.	Final Inspection	Assembly	Insulating Resistance	Die Electric Test	All Joints	Technical Specification and relevant standards mentioned therein.	No breakdown of flash over	Inspection Report	P	W	W
11.	Final Inspection	Assembly	Fatigue Testing	Hydro Test	All Joints	Notes to MR	No Leak	Inspection Report	P	W	W
12.	Final Inspection	Assembly	Holiday Detection	Holiday Tester	All Joints		No Holiday	Inspection Report	P	W	W

NOTE: 1. **All items shall be provided with EN 10204-3.2 certificates**

	QUALITY ASSURANCE PLAN FOR INSULATING JOINTS	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0077/05/21/000/M/IJ/QAP-009** **SPECIFICATIONS: MEC/TS/05/21/009**

LEGENDS: H – Hold (Offer for Witness & obtain clearance), W – Witness, R – Review, A – Approval, I – Information, X – Submit, PO – Purchase Order, PR – Purchase Requisition, SR– Stress Relieving, MPI – Magnetic Particle Inspection, DI-Dye Penetrant Test, UT – Ultrasonic examination, TS – Technical Specification, WPS – Welding Procedure Specification, PQR – Procedure Qualification Record, WQT – Welder Qualification Test.

All the NDT / Leak Testing / Heat Treatment / Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between purchase specification, contract documents and ITP more stringent conditions shall be applicable. The document describes generally the requirements pertaining to all types of Insulating Joints. Requirements specific to the item are only applicable.

For VENDOR

(Stamp & Signature)

Format No. : 05/21/IJ/001

QAP FOR MANUFACTURING OF FLOW TEES

QUALITY ASSURANCE PLAN FOR FLOW TEES

Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by
0	02.07.2026	ISSUED FOR IMPLEMENTATION	CSV	AM	HK

Format No. : 05/21/FT/001

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/011, R-0 WITH AMENDMENTS	SCOPE OF INSPECTION

	QUALITY ASSURANCE PLAN FOR FLOW TEES	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0085/05/28/M/000/QAP-011** **SPEC. NO.: MEC/TS/05/21/011**

SL. NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS & ACCEPTANCE NORMS	RECORD	Sub Vendor	Vendor	Vendor appointed TPI	MECON /IGGL
1.	**RAW MATERIAL INSPECTION**										
2.	Material	EQUAL/ UNEQUAL TEE AS PER EN 10204,3.2	Visual, Dimension, Finish, Mechanical Properties (TS, YS, %RA, %EL) Impact (-0 Degree C), Hardness & Others, Chemical Properties, Supply condition (Heat Treatment), Deoxidation (As per applicable specification)	Visual, dimensions verification of markings with MTC, Review MTC	100%	Applicable Material Specification, MECON specification , Approved Drawing	MTC	-	W	W	R
3.	Material	EQUAL/ UNEQUAL TEE AS PER EN 10204,3.2	Soundness of Tee (NDT)	Ultrasonic test of entire surface	100%	Applicable Material specification, MECON specification , Approved Drawing	MTC	-	W	W	R
4.	Material	END COVER/FORGED RINGS	Visual, Dimension, Finish, Mechanical Properties (TS, YS, %RA, %EL)	Visual, dimensions verification of markings with MTC,	100%	Applicable Material specification, MECON specification	MTC	-	W	W	R

	QUALITY ASSURANCE PLAN FOR FLOW TEES	PROJECT: DULIAJAN FEEDER LINE QAP NO.: MEC/E/0085/05/28/M/000/QAP-011 SPEC. NO.: MEC/TS/05/21/011

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/011, R-0 WITH AMENDMENTS								SCOPE OF INSPECTION			
SL. No.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS & ACCEPTANCE NORMS**	**RECORD**	**Sub Vendor**	**Vendor**	**Vendor appointed TPI**	**MECON /IGGL**
		AS PER EN 10204,3.2	Impact (-20 Degree C) Hardness & Others, Chemical Properties, Supply condition (Heat Treatment)	Review MTC		, Approved Drawing					
5.	Material	END COVER/ FORGED RINGS AS PER EN 10204,3.2	Soundness of End cover/Forged Rings (NDT)	Review of Magnetic particle test reports Or Ultrasonic test of entire surface	100%	Applicable Material specification, MECON specification , Approved Drawing	MTC	-	W	W	R
6.	Material	INTERNAL SLEEVE	Visual, Dimension, Physical & Chemical properties	Review MTC	100%	Applicable Material specification, MECON specification , Approved Drawing	MTC	-	W	W	R
7.	**IN PROCESS QUALITY CONTROL**										
8.	IN	Welding procedure	Welding parameters	Verification of parameters &	100%	ASME SECIX	ASME SECIX	-	P	Review of existing	R

	QUALITY ASSURANCE PLAN FOR FLOW TEES	PROJECT: DULIAJAN FEEDER LINE QAP NO.: MEC/E/0085/05/28/M/000/QAP-011 SPEC. NO.: MEC/TS/05/21/011

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/011, R-0 WITH AMENDMENTS								SCOPE OF INSPECTION			
SL. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS & ACCEPTANCE NORMS**	**RECORD**	**Sub Vendor**	**Vendor**	**Vendor appointed TPI**	**MECON / IGGL**
	Process	Specification (WPS)		Mechanical testing /Review of established WPS			& Addenda			WPS/PQR/WQR by TPIA if suitable, In the non-suitability of established WPS/PQR shall be witness by TPIA	
9.	IN Process	Welding procedure Qualification Record	Mechanical Testing & Welding parameters	Verification of parameters & Mechanical testing /Review of establish PQR	100%	ASME SECIX	ASME SECIX & Addenda	-	P	Same as Sl No.8	R
10.	IN Process	Welder performance qualification	Welder's ability weld soundness radiography	Verification of Parameters & Mechanical testing/ Review of established WPS	100%	ASME SECIX	ASME SECIX & Addenda	-	P	Same as Sl No.8	R

	QUALITY ASSURANCE PLAN FOR FLOW TEES	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0085/05/28/M/000/QAP-011** **SPEC. NO.: MEC/TS/05/21/011**

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/011, R-0 WITH AMENDMENTS								**SCOPE OF INSPECTION**			
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS & ACCEPTANCE NORMS**	**RECORD**	**Sub Vendor**	**Vendor**	**Vendor appointed TPI**	**MECON /IGGL**
11.	IN Process	Fit up of Circ. Seam Joints	Visual dimension set up	Visual dimensions. DP at edges	100%	Approved Drawings, ASME/ANSI B31.8	IIR	-	P	W	R
12.	IN Process	Internal Sleeve Weld	Soundness of weld	UT/MPI	100%	ASME SEC V & ASME SEC VIII, Div. I	IIR	-	P	W	R
13.	IN Process	Butt Welds (Tee to forged ends)	Soundness of weld	Radiography	100%	ASME SEC V & ASME SEC VIII, Div. IAPI 1104	RT report	-	P	W	R
14.	IN Process	Bevel Ends	Lamination & other defects	MPI	100%	ASME SEC V & ASME SEC VIII, Div. I	MPI report	-	P	W	R
15.	IN Process	Post weld Heat Treatment	-	Review of Heat Treatment chart	100%	ASME SEC VIII, Div. I /Approved procedure	H.T. Chart	-	P	W	R
16.	FINAL INSPECTION /TESTING										
17.	Final Inspection	Hardness at body, weld & HAZ	Hardness	Measurement	100%	Approved Drawing/Specification	Inspection Report	-	P	W	W

	QUALITY ASSURANCE PLAN FOR FLOW TEES	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0085/05/28/M/000/QAP-011** **SPEC. NO.: MEC/TS/05/21/011**

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/011, R-0 WITH AMENDMENTS								**SCOPE OF INSPECTION**			
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS & ACCEPTANCE NORMS**	**RECOR D**	**Sub Vendor**	**Vendor**	**Vendor appointed TPI**	**MECON /IGGL**
18.	Final Inspection	Product	Completeness & dimensional Visual	Visual & Measurement	100%	Approved Drawing/Specification	Inspection Report	-	P	W	W
19.	Final Inspection	Finished Weld ends of Flow Tee	Lamination	Ultrasonic testing (with D meter)	100%	Approved Drawing/Specification	Inspection Report	-	P	W	W
20.	Hydro Testing	Product	Soundness of Flow Tee	-	100%	Approved Drawing/Specification	Issue a certificate for each Flow Tee capable of withstanding ng without leakage at least 15 minutes on cal. Pressure.	-	P	W	W

	QUALITY ASSURANCE PLAN FOR FLOW TEES	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0085/05/28/M/000/QAP-011** **SPEC. NO.: MEC/TS/05/21/011**

APPLICABLE CODES AND SPECIFICATIONS: MEC/TS/05/21/011, R-0 WITH AMENDMENTS								**SCOPE OF INSPECTION**			
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERISTICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS & ACCEPTANCE NORMS**	**RECORD**	**Sub Vendor**	**Vendor**	**Vendor appointed TPI**	**MECON / IGGL**
20.	**FINISHING & PAINTING**										
21.	Finishing	Product surface preparation	Surface cleaning	Visual	100 %	Approved Drawing/Specification	IIR	-	P	W	R
22.	Finishing	product	Painting	Visual & Measurement	100 %	Approved Drawing/Specification	IIR	-	P	W	W / R
23.	**FINAL DOCUMENTATION AS PER EN 10204-3.2**										
24.	**FINAL DOCUMENTATION AS PER EN 10204-3.2**		RECORD	CHECK	100 %	Approved Drawing/Specification	IIR	-	P	C	H
25.	**Release Note**						EN 10204-3.2 certificate	-	H	-	P

	QUALITY ASSURANCE PLAN FOR FLOW TEES	**PROJECT: DULIAJAN FEEDER LINE** **QAP NO.: MEC/E/0085/05/28/M/000/QAP-011** **SPEC. NO.: MEC/TS/05/21/011**

NOTE: 1**. All items shall be provided with EN 10204-3.2 certificates**

Legends: H – Hold (Offer for Witness & obtain clearance), W – Witness, P-Perform, R – Review, C- CERTIFICATION – Information, X – Submit, PO – Purchase Order, PR – Purchase Requisition, N-Normalizing, N&T – Normalizing & Tempering, SA – Solution annealing, N & SR – Normalizing & Stress relieving.

All the NDT / Leak Testing / Heat Treatment / Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between purchase specification, contract documents and ITP more stringent conditions shall be applicable. The document describes generally the requirements pertaining to all types of Flow Tees. Requirements specific to the item are only applicable.

For CONTRACTOR/ SUB-CONTRACTOR

(Stamp & Signature)

QUALITY ASSURANCE PLAN
FOR
FLANGES

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 and MEC/TS/05/21/026, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	**STAGE**	**CHARACTERISTICS**	**CATEGORY**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor/ Sub Vendor**	**TPI**	**MECON**
1.	Review of PO / Drg.	Review of PO Doc. / Drg.	Critical	Scrutiny / Verification	Each doc. of P.O.	Appl. Spec. / STD	-	-	P	R	R
2.	Raw Material	1. Manufacturing process of steel 2. Visual 3. Dimensional 4. Chemical Composition	Critical	Verification with M.T.C. Spectro Analysis	Each Heat Each Heat	Appl. Material Specification / STD	As per tender document / Material Specification / STD	Material Test Certificate and MI Register	P	R	R
3.	Forgins	1. Reduction Ratio 2. Temperature During Forging 3. Forging Dimensions	Critical	Measurement Optical Pyrometer Measurement	Minimum 1 per size	Standard Manufacturing Procedure	Std. Procedure As per Std. AMSE B16.5	Forging process record / internal Register	P	R	R
4.	Heat Treatment (as applicable)	Heat Treatment Cycle	Major	Verification of Heat Treatment Cycle	Each Heat / HT Lot	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	T.P.M. Sheet, Heat Treatment Graph	P	W	R
5.	Mechanical Testing (as applicable)	1. Tensile Test (TS, YS, RA%, EL%) 2. Hardness 3. Charpy V-Notch Test	Major	Tensile Testing IMPACT Testing	One / HT / Lot / Group	As per Tender Doc. / Material Specification / STD	Std. Procedure As per Tender Doc. / Material Specification / MECON Std	Mechanical Test Report & T.C.	P	W	R

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 and MEC/TS/05/21/026, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	**STAGE**	**CHARACTERISTICS**	**CATEGORY**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor/ Sub Vendor**	**TPI**	**MECON**
6	NDT	1. DP 2. UT 3. MPI	Major	DP Testing Ultrasonic Flaw Detector MPI Testing	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Mechanical Test Report & T.C.	P	W	R
7.	Final Inspection	Visual & Dimensions	Major	Visual / Measurement	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Dimension Report Format	P	W	W
8.	Making, Colour Coding, Rust Prevension & Packing	Making, Colour Coding, Rust Prevension & Packing	Major	Visual	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Packing List	P	W	R
10.	Certification & Release Notes	Inspection Release Note as per EN 10204 Type 3.2	Major	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Release Note	R	IR	H
11.	Shipping	Verification of surface coating / type of packing	Major	-	-	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Shipping documents	P	R	R

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 and MEC/TS/05/21/026, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	STAGE	CHARACTERISTICS	CATEGORY	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor/ Sub Vendor	TPI	MECON

Note :

1. MAKE : As per Approved Make List in Tender Document or Approved PTR as per Tender conditions .
2. All items shall be provided with EN 10204 Type 3.2 certificate.
3. All inspection related documents shall be reviewed (Sign & Stamp) by the contractor.

Legends : H – Hold (Offer for Witness & obtain clearance), W – Witness, R – Review, A – Approval, I – Information, IR – Issue Release Note, C – Certify, X – Submit, PO – Purchase Order, PR – Purchase Requisition, SR – Stress Relieving, MPI – Magnetic Particle Inspection, DI-Dye Penetrant Test , UT – Ultrasonic examination, TS – Technical Specification, WPS – Welding Procedure Specification, PQR – Procedure Qualification Record, WQT – Welder Qualification Test.

All the NDT / Leak Testing / Heat Treatment / Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between purchase specification, contract documents and ITP more stringent conditions shall be applicable. The document describes generally the requirements pertaining to all types of Flanges. Requirements specific to the item are only applicable.

QUALITY ASSURANCE PLAN
FOR
FITTINGS

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 and MEC/TS/05/21/026, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERI-STICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor/ Sub Vendor**	**TPI**	**MECON**
1.	Material	FITTINGS	Fully killed steel	MTC	100%	PO & Std. Spec.	PO QAP & Std. Spec.	MTC	P	R	R
2.	Inspection	FITTINGS									
i)	Visual Inspection	FITTINGS	Visual Imp.	Visual Internal & External Surface	100%			Inspection Report	P	W	R
ii)	NDT	FITTINGS	Soundness of Tee & Butt Welds	UT, RT & MPI	100%	PO & Std. Spec.	PO QAP & Std. Spec.	Inspection Report	P	W & Evaluation of RT Films	R
iii)	NDT	FITTINGS	Forgings	WET MPI	100%	PO & Std. Spec.	To comply with MSS-SP-53	Inspection Report	P	W	R
iv)	NDT	FITTINGS	End Laminations	UT for Distance of 25 mm on ends.	100%	PO & Std. Spec.	Any lamination than 6.35 mm not accepted	Inspection Report	P	W	R
v)	Testing Destructive	FITTINGS	Properties of Mech. / Chemical & Impact Test	Chemical by Spectro and other test as per ASTM A - 370	As per Heat / Lot	PO & Spec.	MSS-SP-75	IMP Lab Report	P	W	R

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 and MEC/TS/05/21/026, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	**STAGE**	**COMPONENT**	**CHARACTERI-STICS**	**METHOD OF CHECK**	**QUANTUM OF CHECK**	**REFERENCE DOCUMENTS**	**ACCEPTANCE NORMS**	**RECORD**	**Vendor/ Sub Vendor**	**TPI**	**MECON**
3.	Final Inspection	FITTINGS	Dimensional	-	As per lot	PO & Spec.	PO & Spec.	Inspection Report	P	W	W
4.	Marking	FITTINGS	Identification manufacturer's Name, nominal diameter end thickness malts & Tag No.	By painting	100%	PO & Spec.	-	-	P	W	R
5.	Certification & Release Notes	FITTINGS	Inspection Release Note as per EN 10204 Type 3.2	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Release Note	R	IR	H
6.	Shipping	FITTINGS	Verification of surface coating / type of packing	-	-	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Shipping documents	P	R	R

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 and MEC/TS/05/21/026, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	STAGE	COMPONENT	CHARACTERI-STICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor/ Sub Vendor	TPI	MECON

Note :

1. MAKE : As per Approved Make List in Tender Document or Approved PTR as per Tender conditions .
2. All items shall be provided with EN 10204 Type 3.2 certificate.
3. All inspection related documents shall be reviewed (Sign & Stamp) by the Contractor.

Legends : H – Hold (Offer for Witness & obtain clearance), W – Witness, R – Review, A – Approval, I – Information, IR – Issue Release Note, C – Certify, X – Submit, PO – Purchase Order, PR – Purchase Requisition, N-Normalizing, N&T – Normalizing & Tempering, SA – Solution annealing, N & SR – Normalizing & Stress relieving.

All the NDT / Leak Testing / Heat Treatment / Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between purchase specification, contract documents and ITP more stringent conditions shall be applicable. The document describes generally the requirements pertaining to all types of Fittings. Requirements specific to the item are only applicable.

	CONTRACTOR	**QUALITY ASSURANCE PLAN FOR WARNING MAT (EN 12613)**	PROJECT :
	ORDER NO. & DATE		PACKAGE NO.
	SUB-CONTRACTOR		PACKAGE NAME :
	ORDER NO. & DATE		ITEM : PE Anti-Rodent Warning Mat

Main Client	:	
Consultants	:	M/S MECON LIMITED, DELHI
Contractor	:	
Supplier Name & Address	:	
Supplier P.O. No.	:	
Job No.:	:	
Name of Project	:	
Item Description	:	PE Anti-Rodent Warning Mat.
Reference Standard	:	EN 12613-2019
Manufacturing Process	:	Extrusion of HDPE Film/ Sheet.
Size	:	D+300 mm Width x 1 mm Thick for steel Pipeline, 300 mm width for PE Pipelines. Roll length: Minimum 100 m (± 5 m)
Color	:	Golden Yellow with Red Text Legend.
TPI Agency	:	Hired and deployed by Package Contractor as per Tender/ PO guidelines

Abbrevations : P= Perform; W=Witness; ; RW=Random Witness (Min. 10% Witness); R=Review; T.C.=Test Certificate

Prepared by
30-12-25
(Sachin Kumar)
AGM

Checked by
30/12/25
(Harsh Kumar)
DGM

Approved by
08/02/2026
(A.K. Jha)
CGM

	CONTRACTOR ORDER NO. & DATE SUB-CONTRACTOR ORDER NO. & DATE	**QUALITY ASSURANCE PLAN FOR WARNING MAT**	PROJECT : PACKAGE NO. PACKAGE NAME : ITEM : PE Anti-Rodent Warning Mat

Sr No	Name of Test	Type of check/ Method	Sampling model for manufacturer	Inspection by Mfr/ Lab.	Acceptance Criteria	Agency				Format of Record	Remarks (If any)
						Mfr.	TPIA	CONTR	MECON/ CLIENT		
1	Dimension & tolerance: Width & Thickness	Measurement	Three samples from each lot / batch/Batch	At Mfr's Works	Min. Width: D+300 mm for Steel pipe and 300 mm for PE pipe. Thk.: 1mm ± 0.1mm	P	W	R	R	Test Report	
2	Material Identification (HDPE)	Measurement as per:	One sample to be tested from each lot / batch of PE compound	At Mfr's Works/ Other NABL Lab		P	W	R	R	Test report	
i.	Density	ASTM D792			≥ 0.941 g/cc						
ii.	Melt flow Rate (190°C,2.16 kg load)	ASTM D1238			≥ 0.25 g/10 min						
iii.	Tensile strength at break	ASTM D638			≥ 20 MPa						
iv.	Elongation at break	ASTM D638			≥ 600%						
3	Color of Mat	Visual	Three sample to be tested from each lot / batch.	At Mfr's Works	Golden Yellow color (RAL-1004)	W	W	R	R	Test Report	
4	Text legend Printing on Mat	Visual	Three samples from each lot / batch	At Mfr's Works	Red color	W	W	R	R	Test Report	
5	Tensile Withstand Test	Measurement as per EN 12613 cl. no. 6.3	Three samples to be tested from each lot / batch.	At Mfr's Works	As per EN 12613 cl. no. 5.4.2 (Shall withstand a load of 200N for 1 min & shall not exhibit a reduction of more than 20% after removal of load)	P	W	R	R	Test Report	

	CONTRACTOR ORDER NO. & DATE SUB-CONTRACTOR ORDER NO. & DATE	**QUALITY ASSURANCE PLAN FORWARNING MAT**	PROJECT : PACKAGE NO. PACKAGE NAME : ITEM : PE Anti-Rodent Warning Mat

Sr No	Name of Test	Type of check/ Method	Sampling model for manufacturer	Inspection by Mfr/ Lab.	Acceptance Criteria	Agency				Format of Record	Remarks (If any)
						Mfr.	TPIA	CONTR	MECON/ CLIENT		
6	Color fastness Test: After 28 days at 15°C in 20% Ammonium sulphide solution. (Type Test)	Review of TC (As per Annex-B of EN 12613)	Test report by any TPIA not older than 1 year	Performed at any independent Lab.	Satisfactory, while comparing the test specimen with production specimen of that batch in cool light with white background.	P	R	R	R	Test certificate	
7	Performance of printing stability	Visual (EN 60898-1, cl. no. 9.3)	Three samples from each lot / batch	At Mfr's Works	Sample shall pass (Marking shall be easily legible and Non-deletable).	P	W	R	R	Test Report	
8	Visual warning characteristics (Trench Simulation Test)	Visual/ Measurement (As per Annex-A of EN 12613)	Three samples from each lot / batch	At Mfr's Works	As per EN 12613, cl. no. 5.5	P	W	R	R	Test Report	
9	Anti-Rodent Test (Type Test) - Non Toxic, Non Hazardous, Non Bio degradable	Review of TC	Test report by any TPIA not older than 1 year	Testing at any independent Lab.	Pass. Anti-Rodent Test. Protection against rodent attack. Document/Certificate issued by supplier for Anti Rodent Master Batch as per PTS - Toxicology data, ROHS Compliance & Non- biocidal product. Manufacturer has to declare the addition of Anti-Rodent additive in the same proportion as tat used for Type test.	P	R	R	R	Test certificate	

	CONTRACTOR ORDER NO. & DATE SUB-CONTRACTOR ORDER NO. & DATE	**QUALITY ASSRANCE PLAN FOR WARNING MAT**	PROJECT : PACKAGE NO. PACKAGE NAME : ITEM : PE Anti-Rodent Warning Mat

Sr No	Name of Test	Type of check/ Method	Sampling model for manufacturer	Inspection by Mfr/ Lab.	Acceptance Criteria	Agency				Format of Record	Remarks (If any)
						Mfr.	TPIA	CONTR	MECON/ CLIENT		
10	Identification, Marking Art Work	Visual	Three sample from each lot / batch.	At Mfr's Works	Reference standard: EN12613 Client Logo-followed by Client Name, Warning symbols with safety message and Telephone symbol with contact numbers in English & local language at defined interval. The gap between consecutive printed warning messages (text & symbols) shall be within 1 meter. Printing shall be done as per approved layout. Roll length 100 m minimum.	P	RW	R	R	Test Report	
11	Packaging and transportation	Visual	Whole Lot		Warning Mat rolls shall be packed in in sturdy opaque woven sacks and shall be fully covered. Care shall be taken while loading and unloading of the rolls to not to damage the warning mat as well as the cover.	P	RW	R	R	Packaging Report	

MECON Limited (A Govt. of India Enterprise)	**QUALITY ASSURANCE PLAN FLAME ARRESTOR**	PROJECT: QAP No.: ITEM: FLAME ARRESTOR Page 1 of 2

								SCOPE OF INSPECTION			
Sr. NO.	**COMPONENT/ OPERATION**	**CHARACTERISTICS**	**CLASSIFICATION**	**TYPE OF CHECK**	**EXTENT OF CHECK**	**ACCEPTANCE SPEC./DOC.**	**FORMAT OF RECORD**	**MANUFACTURER**	**TPI**	**MECON/ IGGL**	**REMARK**
	COMPONENT										
1.	FA Body	Physical/Chemical	Major	Co-relation /Check test	100%	A 420 WPL 6 & SA 516 Gr. 70	MTC	P	W	-	
	FA Body Flange	Physical/Chemical	Major	Co-relation /Check test	100%	A 350 Gr. LF2	MTC	P	W	-	
	FA Housing & Dome	Physical/Chemical	Major	One sample per Lot/ Batch	100%	SS 316L	MTC	P	W	-	
	FA Element	Chemical	Major	One sample per Lot/ Batch	Sample	SS 316L	LTC	P	W	-	
	MANUFACTURING										
2.	Machining	Dimension	Major	Visual/ Dimensional	100%	As per Drg.	In Process Inspection Report	P	W	-	
	Assembly	Overall Dimension	Critical	Visual/ Dimensional	100%	As per Drg.	In Process Inspection Report	P	W	R	
	Testing (FA Body)	Leakage	Critical	Hydro Test @ 1.5 times design pressure for 5 mins	100%	No Leak	Final Inspection Report	P	W	R	
	FINAL INSPECTION										
3.	Flame Arrestor	Visual/Overall Dimensions	Major	Visual/ Dimensional	100%	Approved Drg.	Final Inspection Report	P	W	R	
		Performance	Major	Flame Transmission Type Test	Sample	BS 7244:1990 Std.	Certificate	P	W	R	

For MECON
(Stamp & Signature)

For CONTRACTOR/SUB-CONTRACTOR
(Stamp & Signature)

4.	**FINAL DOCUMENTS**	Final Internal Inspection Report, MTC, LTC, Type Test Certificate, TPI Inspection Report & Inspection Release Note, Compliance Painting Report, Testing (As per IEC 80079-49/ BS 7244 & other applicable codes/standards) report	P	R	R	

Notes:

1. Calibration certificate for all major measuring instruments to be provided by the manufacturer/vendor.
2. All items shall be provided with EN 10204 Type 3.2 certificate. Vendor/Manufacturer will provide NABL approved Lab Test Report for the material for which MTC is not available.

Legend/ Abbreviation

P = Performed By
W = Witnessed By
R = Reviewed By
MTC = Manufacturer Test Certificate
LTC = Laboratory Test Certificate

For MECON (Stamp & Signature)		For CONTRACTOR/SUB-CONTRACTOR (Stamp & Signature)	

	CONTRACTOR	**QUALITY ASSURANCE PLAN FOR** STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT :
	ORDER NO. & DATE		BID DOCUMENT NO. :
	SUB-CONTRACTOR		ITEM NAME : PRESSURE SAFETY VALVE
	ORDER NO. & DATE		SPEC. NO.: MEC/TS/05/62/056, REV-01

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
H : HOLD
R : REVIEW
W : WITNESS
P : PERFORM

KEY TO SYMBOLS :

* : MFR/ CONTRACTOR - AS APPLICABLE
** : TEST TO BE PERFORMED, IF APPLICABLE

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*	*Code*	*Description*	*Code*	*Description*	*Code*	*DOCUMENTS:*
1.	Visual	18.	Amplitude Test	34.	Internal Inspection Report by Contractor	D1.	Approved GA drawings
2.	Dimensional	19.	Sponge Test	35.	Hardness Test	D2.	Information and other reference drg/ stamped drgs released for mfg.
3.	Fitment & Alignment	20.	Dust/ Water Ingress Test	36.	Spark Test for Lining	D3.	Relevant catalogues
4.	Physical Test (Sample)	21.	Friction Factor Test	37.	Calibration	D4.	Bill of matl./Item no./ Identification
5.	Chemical Test (Sample)	22.	Adhesion Test	38.	Safety Device Test	D5.	Matchmarks details
6.	Ultrasonic Test	23.	Performance Test/Characteristic Curve	39.	Ease of Maintenance	D6.	Line/ Layout diagram
7.	Magnetic Particle Test (MPI)	24.	No Load/ Free Running Test	40.	Fire Test (Type Test)	D7.	Approved erection procedures
8.	Radiography Test	25.	Load/ Overload Test	41.	Charpy V-Notch Test	D8.	Unpriced sub P.O. with specification and amend-ments, if any
9.	Dye Penetration Test	26.	Measurement of Speeds	42.	Operational Torque Test	D9.	Calibration Certificate of all measuring instruments and gauges
10.	Metallographic Exam.	27.	Accoustical Test	43.	ENP (Electroless Nickel Plating) Execution	D10.	X-Ray Reports
11.	Welder's Qualification & Weld Procedure Test	28.	Geometrical Accuracy	44.	Painting		
12.	Approval of Test and Repair Procedure	29.	Repeatability and Positioning Accuracy	45.	Anti-Static Test		
13.	Heat Treatment	30.	Proving Test	46.	Hydrostatic Double Block & Bleed Test		
14.	Pressure Test	31.	Surface Preparation	47.	Functional Test		
15.	Leakage Test	32.	Manufacturer's Test Certificates for bought-out items	48.	Pneumatic Double Block & Bleed Test		
16.	Balancing						
17.	Vibration Test	33.	IBR/ Other Statutory agencies compliance certificate				

EQUIPMENT DETAILS							INSPECTION AND TESTS										Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
							Raw Material and In-Process Stage Inspection						Final Inspection/ Test by							
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No.	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	MFR		TPI		MECON		MFR		TPI		MECON			
1	2	3	4	5	6	7	8		9		10		11		12		13		14	15	16
	PRESSURE SAFETY VALVE (PSV)	-	-	-			1,2,3	P	1,2,4	W	-		1,2,3	P	1,2,3	W	1,2,3	R	1,2,3,4,5,8,14,15	D1,D3,D8,D10	47
							4,5	P	5,41	W	-		14,15	P	14,15	W	14,47	R	31,32,34,41,44,47	ASME SEC-VIII,DIV-1	100%
							8,41	P	8	R			31,32	P	44,47	W				MECON TS	
													44,47	P	31,32	R				APPROVED DS	

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO.

REV 0

SHEET 1 OF 1

*** To be field by party as per index above & approved by MECON**

MECON मेकॉन ISO 9001 Company	CONTRACTOR		QUALITY ASSURANCE PLAN FOR STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT : DULIAJAN FEEDER LINE PROJECT OF IGGL
	ORDER NO. & DATE			PACKAGE NO. :
	SUB-CONTRACTOR			PACKAGE NAME : **FASTNERS**
	ORDER NO. & DATE			MR NO. : TS No.: **MEC/S/05/21/19**

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
H : HOLD
R : REVIEW
W : WITNESS

KEY TO SYMBOLS :

* - If applicable
\# - As applicable

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*
1.	Visual
2.	Dimensional
3.	Fitment & Alignment
4.	Physical Test (Sample)
5.	Chemical Test (Sample)
6.	Ultrasonic Test
7.	Magnetic Particle Test (MPI)
8.	Radiography Test
9.	Dye Penetration Test
10.	Metallographic Exam.
11.	Welder's Qualification & Weld Procedure Test
12.	Approval of Test and Repair Procedure
13.	Heat Treatment
14.	Pressure Test
15.	Leakage Test
16.	Balancing
17.	Vibration Test
18.	Amplitude Test
19.	Sponge Test
20.	Dust/ Water Ingress Test
21.	Friction Factor Test
22.	Adhesion Test
23.	Performance Test/Characteristic Curve
24.	No Load/ Free Running Test
25.	Load/ Overload Test
26.	Measurement of Speeds
27.	Accoustical Test
28.	Geometrical Accuracy
29.	Repeatability and Positioning Accuracy
30.	Proving Test
31.	Surface Preparation
32.	Manufacturer's Test Certificates for bought-out items
33.	IBR/ Other Statutory agencies compliance certificate
34.	Internal Inspection Report by Contractor
35.	Hardness Test
36.	Spark Test for Lining
37.	Calibration
38.	Safety Device Test
39.	Ease of Maintenance
40.	Fire Test (Type Test)
41.	Charpy V-Notch Test
42.	Operational Torque Test
43.	ENP (Electroless Nickel Plating) Execution
44.	Painting
45.	Anti-Static Test
46.	Hydrostatic Double Block & Bleed Test
47.	Functional Test
48.	Pneumatic Double Block & Bleed Test
49.	Proof Test (Type Test)
50.	Dielectric Test
51.	Bending parameter
52.	PMI Check

Code	*DOCUMENTS:*
D1.	Approved GA drawings
D2.	Information and other reference drg/ stamped drgs released for mfg.
D3.	Relevant catalogues
D4.	Bill of matl./Item no./ Identification
D5.	Matchmarks details
D6.	Line/ Layout diagram
D7.	Approved erection procedures
D8.	Unpriced sub P.O. with specification and amend-ments, if any
D9.	Calibration Certificate of all measuring instruments and gauges
D10.	X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS						Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (MR Item No.)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage Inspection			Final Inspection/ Test by					
							MFR (P)	TPIA (W)	MECON (R)	MFR (P)	TPIA (RW)	MECON (W/R)			
1		3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.0	FASTNERS		As per SOR/ MTO				1,2,4,5, 6/7#, 13, 35, 41	1,2,4,5, 6/7#, 13, 35, 41	1,2,4,5, 6/7#, 13, 35, 41	1, 2, 44, 51*	1, 2, 44, 51*	1, 2, 44, 51*	1,2,4,5,6, 13,15, 41,51,D9	D1, D2 , MECON's T.S. & Relevant Standards mentioned therein	100%
					P - Perform,										
					W - Witness										
					R - Riview										
					RW - Random Witness										

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/E/0085/05/21/M/001/QAP-019F REV 0

SHEET **1 OF 1**

MECON मेकॉन ISO 9001 Company	CONTRACTOR		QUALITY ASSURANCE PLAN FOR STRUCTURAL AND MECHANICAL EQUIPMENT	PROJECT : DULIAJAN FEEDER LINE PROJECT OF IGGL
	ORDER NO. & DATE			PACKAGE NO. :
	SUB-CONTRACTOR			PACKAGE NAME : **GASKETS**
	ORDER NO. & DATE			MR NO. : TS No.: **MEC/S/05/21/19**

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilograms must be indicated under Column-5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
H : HOLD
R : REVIEW
W : WITNESS

KEY TO SYMBOLS :

* - If applicable (For RTJ Joints)
\# - As applicable (compressibility & Sealability)

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS :

Code	*Description*
1.	Visual
2.	Dimensional
3.	Fitment & Alignment
4.	Physical Test (Sample)
5.	Chemical Test (Sample)
6.	Ultrasonic Test
7.	Magnetic Particle Test (MPI)
8.	Radiography Test
9.	Dye Penetration Test
10.	Metallographic Exam.
11.	Welder's Qualification & Weld Procedure Test
12.	Approval of Test and Repair Procedure
13.	Heat Treatment
14.	Pressure Test
15.	Leakage Test
16.	Balancing
17.	Vibration Test
18.	Amplitude Test
19.	Sponge Test
20.	Dust/ Water Ingress Test
21.	Friction Factor Test
22.	Adhesion Test
23.	Performance Test/Characteristic Curve
24.	No Load/ Free Running Test
25.	Load/ Overload Test
26.	Measurement of Speeds
27.	Accoustical Test
28.	Geometrical Accuracy
29.	Repeatability and Positioning Accuracy
30.	Proving Test
31.	Surface Preparation
32.	Manufacturer's Test Certificates for bought-out items
33.	IBR/ Other Statutory agencies compliance certificate
34.	Internal Inspection Report by Contractor
35.	Hardness Test
36.	Spark Test for Lining
37.	Calibration
38.	Safety Device Test
39.	Ease of Maintenance
40.	Fire Test (Type Test)
41.	Charpy V-Notch Test
42.	Operational Torque Test
43.	ENP (Electroless Nickel Plating) Execution
44.	Painting
45.	Anti-Static Test
46.	Hydrostatic Double Block & Bleed Test
47.	Functional Test
48.	Pneumatic Double Block & Bleed Test
49.	Proof Test (Type Test)
50.	Dielectric Test
51.	Bending parameter
52.	PMI Check

Code	*DOCUMENTS:*
D1.	Approved GA drawings
D2.	Information and other reference drg/ stamped drgs released for mfg.
D3.	Relevant catalogues
D4.	Bill of matl./Item no./ Identification
D5.	Matchmarks details
D6.	Line/ Layout diagram
D7.	Approved erection procedures
D8.	Unpriced sub P.O. with specification and amend-ments, if any
D9.	Calibration Certificate of all measuring instruments and gauges
D10.	X-Ray Reports

EQUIPMENT DETAILS							INSPECTION AND TESTS								
Sl. No.	Description (with equipment heading, place of use and brief specifications)	Identification No. (MR Item No.)	Quantity No./M	Unit Weight (Kg)	Manufacturer's Name and Address	Expected Schedule of Final Inspn.	Raw Material and In-Process Stage Inspection			Final Inspection/ Test by			Test Certificates & Documents to be submitted to MECON	Acceptance Criteria Standards/ IS/ BS/ ASME/ Norms and Documents	REMARKS/ SAMPLING PLAN
							MFR (P)	TPIA (W)	MECON (R)	MFR (P)	TPIA (RW)	MECON (W/R)			
1		3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.0	GASKETS		As per SOR/ MTO				1, 2, 4# 13*, 35*	1, 2, 4# 13*, 35*	1, 2, 4# 13*, 35*	1, 2, 44, 51* & Stamping	1, 2, 44, 51* & Stamping	1, 2, 44, 51* & Stamping	1,2,4,5,6, 13,15, 41,51,D9	D1, D2 , MECON's T.S. & Relevant Standards mentioned therein	100%
					P - Perform,										
					W - Witness										
					R - Riview										
					RW - Random Witness										

For MECON (Stamp & Signature)

For CONTRACTOR/ SUB-CONTRACTOR (Stamp & Signature)

QAP NO. MEC/E/0085/05/21/M/001/QAP-019G REV 0

SHEET **1 OF 1**

QUALITY ASSURANCE PLAN
FOR
SPLIT TEE

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	STAGE	COMPONENT	CHARACTERI-STICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON/ IGGL
1.	Material	FITTINGS	Fully killed steel	MTC	100%	PO & Std. Spec.	PO QAP & Std. Spec.	MTC	W	R	R
2.	Inspection	FITTINGS									
i)	Visual Inspection	FITTINGS	Visual Imp.	Visual Internal & External Surface	100%			Inspection Report	W	W	R
ii)	NDT	FITTINGS	Soundness of Tee & Butt Welds	UT, RT & MPI	100%	PO & Std. Spec.	PO QAP & Std. Spec.	Inspection Report	W	W & Evaluation of RT Films	R
iii)	NDT	FITTINGS	Forgings	WET MPI	100%	PO & Std. Spec.	To comply with MSS-SP-53	Inspection Report	W	W	R
iv)	NDT	FITTINGS	End Laminations	UT for Distance of 25 mm on ends.	100%	PO & Std. Spec.	Any lamination than 6.35 mm not accepted	Inspection Report	W	W	R
v)	Testing Destructive	FITTINGS	Properties of Mech. / Chemical & Impact Test	Chemical by Spectro and other test as per ASTM A - 370	As per Heat / Lot	PO & Spec.	MSS-SP-75	IMP Lab Report	W	W	R

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	STAGE	COMPONENT	CHARACTERI-STICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON/ IGGL
3.	Final Inspection	FITTINGS	Dimensional	-	As per lot	PO & Spec.	PO & Spec.	Inspection Report	W	W	W/R
4.	Marking	FITTINGS	Identification manufacturer's Name, nominal diameter end thickness malts & Tag No.	By painting	100%	PO & Spec.	-	-	W	W	W/R
5.	Certification	FITTINGS	As per EN 10204 Type 3.2	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	TC & Reports	W	C	R
6.	Release Notes	FITTINGS	Inspection Release Note	Verification of PO Spec. & QAP	100%	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Release Note	H	-	IR

APPLICABLE CODES AND SPECIFICATIONS : MEC/TS/05/21/025, R-0 WITH AMENDMENTS									SCOPE OF INSPECTION		
S. NO.	STAGE	COMPONENT	CHARACTERI-STICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	Vendor	TPI	MECON/ IGGL
7.	Shipping	FITTINGS	Verification of surface coating / type of packing	-	-	As per Tender Doc. / Material Specification / STD	As per Tender Doc. / Material Specification / MECON Std	Shipping documents	H	R	R

Note : All items shall be provided with EN 10204 Type 3.2 certificate.

Legends : H – Hold (Offer for Witness & obtain clearance), W – Witness, R – Review, A – Approval, I – Information, IR – Issue Release Note, C – Certify, X – Submit, PO – Purchase Order, PR – Purchase Requisition, N-Normalizing, N&T – Normalizing & Tempering, SA – Solution annealing, N & SR – Normalizing & Stress relieving.

All the NDT / Leak Testing / Heat Treatment / Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used. In case of conflict between purchase specification, contract documents and ITP more stringent conditions shall be applicable. The document describes generally the requirements pertaining to all types of Fittings. Requirements specific to the item are only applicable.

For CONTRACTOR/ SUB-CONTRACTOR

(Stamp & Signature)

INSPECTION AND TEST PLAN

FOR

LONGITUDINAL SEAM SUBMERGED ARC WELDED LINE PIPES (ON SHORE)

Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by
1	APR-16	ISSUED FOR IMPLEMENTATION	Sachin Singhal	Anil Kumar	A.K.Sarkar

1.0 SCOPE:

This Inspection Test Plan covers the minimum testing requirements of LONGITUDINAL SEAM SUBMERGED ARC WELDED LINE PIPES (ON SHORE)

2.0 REFERENCE DOCUMENTS:

1) POIPR/ Standards referred there in Job specifications / Approved documents.

3.0 INPECTION AND TEST REQUIREMENTS:

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION			
					Sub Supplier	Supplier	Supplier Appointed TPI	MECON / CLIENT
1	Hydro Test, Heat Treatment, NDT, Hot Forming, Expansion And Other Procedures	Documented Procedures.	100%	Procedure Documents	-	P	-	R
2	First day production test	All testing requirements as per PR	As per PR	Test report	-	H	H	H

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION			
					Sub Supplier	Supplier	Supplier Appointed TPI	MECON / CLIENT
3	Raw Material Inspection	Heat No., Plate No., Method of Manufacturing, Heat Treatment Condition	100% By Supplier & Supplier appointed TPI and Random By MECON / CLIENT	Inspection Report	-	H	W	W
4	Plate UT	1) 25mm (Min) From Edges 2) 20% Min Coverage In Bal. Part of late	100%	Inspection Report	-	W	W	Calibration-W Plate UT-RW
5	Pipe Forming	Bending surface	100%	Inspection Report	-	W	W	M
6	Pipe Welding (SAW)	1) Automatic Tack Welding 2) ID & 00 Welding	100%	Inspection Report	-	W	W	RW
7	Visual Welding Inspection	Examination Of Welding Defects Inside & Outside	100%	Inspection Report	-	W	W	RW

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION			
					Sub Supplier	Supplier	Supplier Appointed TPI	MECON / CLIENT
8	Cold Expansion	Expansion Ratio	100%	Inspection Report	.	W	W	RW
9	Hydro Test	Leakage & Pressure Drop, Calibration of Gauges Recorder	100%	Inspection Report	-	W	100% W	RW
10	Calibration of Seam U/T M/C & Final Automatic U/T Inspection	Calibration, Seam Tracking. & Examination of Welding Defects	Calibration -Start & End of Every Shift, Seam UT 100% By Supplier & Supplier appointed TPI and Random By MECON / CLIENT	Inspection Report	-	W	100% W	RW
11	Manual Off On Pipe Ends	Lamination	100%	Inspection Report	-	W	100% W	RW

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION			
					Sub Supplier	Supplier	Supplier Appointed TPI	MECON / CLIENT
12	Inspection Of Pipe Ends RT	Welding Defects	203 Mm Length of Both Ends Of Each Pipe As Per PR/Specification	RT Films	-	R	Evaluation of Films	R
13	Inspection Of Pipe Ends MPI	1) Examination of Surface Defects After Bevelling. 2) Demagnetisation	100% By Supplier & Supplier appointed TPI and Random By MECON / CLIENT	Inspection Report	-	H	W	RW
14	Final Inspection	1) Visual Examination 2) Dimensional Check 3) Weight	100%	Inspection Report	-	H	W	RW
15	Mech Properties & Testing	1) Chemical Analysis 2) Tensile Tests of Base Metal 3) Tensile Tests of Weld (Transverse) 4) Guided Bend Tests 5) Macro & Hardness Tests 6) Impact Tests 7) Dwtt	As Per PR	Inspection Report	-	H	W	RW

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION			
					Sub Supplier	Supplier	Supplier Appointed TPI	MECON / CLIENT
16	Marking	Pipe No, Acceptance No., H.No. , Size, Grade, Thickness & Colour Code	100%	Inspection Report	-	H	W / R	RW

Legends: CCE or CCOE-Chief Controller of Explosives, DT- Destructive Testing, HT- Heat treatment, H- Hold (Do not proceed without approval), IBR-Indian Boiler Regulations, ITP-Inspection and Test Plan, NDT- Non Destructive Testing, P-Perform., PO- Purchase Order, PR-Purchase Requisition, PQR- Procedure Qualification Record, QAP-Quality Assurance Plan, Random -10% (min. 1 no.) of each size and type of Bulk item, R-Review, RT- Radiography Testing, RW- random Witness, TC-Test Certificate, VDR- Vendor Data Requirements, WPS-Welding Procedure Specification, WPQ- Welders Performance Qualification, W-Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

1. Wherever W/R or H/W is indicated, Inspection Engineer shall decide the option to be exercised for the particular stage and supplier.
2. Supplier's in house procedures may be accepted in case MECON is satisfied with adequacy of procedures to comply with Purchase order / Specifications requirements. In case of non availability of suitable procedures fresh procedures may be qualified under MECON witness.
3. In case of conflict between purchase specification, contract documents and ITP, more stringent conditions shall be applicable.
4. This document describes generally the requirements pertaining to all types of the item. Requirements specific to PO and the item are only applicable.
5. Acceptance Norms for all the activities shall be as per PO/PR/STANDARDS referred there in / Job Specification / Approved Documents
6. All items shall be provided with EN 10204-3.2 Certificates.

INSPECTION AND TEST PLAN

FOR

ASSORTED PIPES

Rev. No.	Date	Purpose	Prepared	Checked by	Approved by
1	26.02.2020	ISSUED FOR IMPLEMENTATION	Sachin Kumar	Sachin Singhal	A K Gupta

SL.NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	SCOPE OF INSPECTION		
									Manufacturer	TPIA	Client/Mecon
1.0	Raw material inspection	Plate/Sheet/ Strip	(i)Chemical Composition: CE	Testing	One sample per heat	Relevant Code & Technical Specification	As per code & Technical Specification	Mill test Certificate/ report	H	R	R
			(ii)Mechanical properties YS,UTS,EL	Testing	One sample per heat	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection report	H	R	R
2.0	Manufacturing, welding (HFW & SAW)	Pipe	Welding Speed, Current, Voltage, Frequency, Offset, Height of Flash & Trim	Record of Parameter	100% by Vendor	Relevant Code & Technical Specification	Approved WPS	Internal report	P	R	R
3.0	**Product Testing**										
3.1	Destructive Testing	Pipe	Mechanical Properties	Tensile, Flattening, Reverse Bend, Hardness, Impact & Macro	One sample per heat	Relevant Code & Technical Specification	As per code & Technical Specification	Lab Report	W	W	W
			Chemical Properties	Chemical Composition							
3.2	Non Destructive Testing	Pipe	Surface & Internal Inspection	UT/RT or as per code & specification	100% by Vendor	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report/ Internal Record	W	R	R

SL.NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	SCOPE OF INSPECTION		
									Manufacturer	TPIA	Client/Mecon
3.3	Heat Treatment (As Applicable)	Pipe	Stress Relieving, Normalizing, Tempering, Solution Annealing etc.	Temperature Recording	Each Pipe	Relevant Code & Technical Specification	Relevant Code & Technical Specification	HT Chart	P	R	R
4.0	Hydrostatic test	Pipe	No leak	Visual	Each Pipe	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report, Hydraulic Graph	W	W	RW
5.0	Final inspection	Pipe	Straightness, Outer Diameter (Pipe Body, Pipe Ends), Out of Roundness, Thickness, Length, Surface Lamination, Root Face, Bevel Angle	Visual, dimensional	100% by vendor	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report	W	W	RW
6.0	Galvanizing (If Applicable)	Pipe	Integrity of Galvanized Coating	---	Each Pipe	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report	P	R	R
	Legends/Notes:										
.	W-witness, R-Review, RW- Minimum 10% witness and 100% Review ,										

INSPECTION AND TEST PLAN

FOR

CONDUIT PIPES

Rev. No.	Date	Purpose	Prepared	Checked by	Approved by
1	05.05.2020	ISSUED FOR IMPLEMENTATION	Sachin Kumar	Sachin Singhal	A K Gupta

SL.NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	SCOPE OF INSPECTION		
									Manufacturer	TPIA	Client/Mecon
1.0	Raw material inspection	Plate/Sheet/ Strip	(i)Chemical Composition: CE	Testing	One sample per heat	Relevant Code & Technical Specification	As per code & Technical Specification	Mill test Certificate/ report	H	R	R
			(ii)Mechanical properties YS,UTS,EL	Testing	One sample per heat	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection report	H	R	R
2.0	Manufacturing, welding (HFW & SAW)	Pipe	Welding Speed, Current, Voltage, Frequency, Offset, Height of Flash & Trim	Record of Parameter	100% by Vendor	Relevant Code & Technical Specification	Approved WPS	Internal report	P	R	R
3.0	**Product Testing**										
3.1	Destructive Testing	Pipe	Mechanical Properties	Tensile, Flattening, Reverse Bend, Hardness, Impact & Macro	One sample per heat	Relevant Code & Technical Specification	As per code & Technical Specification	Lab Report	W	W	R
			Chemical Properties	Chemical Composition							
3.2	Non Destructive Testing	Pipe	Surface & Internal Inspection	UT/RT or as per code & specification	100% by Vendor	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report/ Internal Record	W	R	R

SL.NO.	STAGE	COMPONENT	CHARACTERISTICS	METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	RECORD	SCOPE OF INSPECTION		
									Manufacturer	TPIA	Client/Mecon
3.3	Heat Treatment (As Applicable)	Pipe	Stress Relieving, Normalizing, Tempering, Solution Annealing etc.	Temperature Recording	Each Pipe	Relevant Code & Technical Specification	Relevant Code & Technical Specification	HT Chart	P	R	R
4.0	Hydrostatic test	Pipe	No leak	Visual	Each Pipe	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report, Hydraulic Graph	W	RW	R
5.0	Final inspection	Pipe	Straightness, Outer Diameter (Pipe Body, Pipe Ends), Out of Roundness, Thickness, Length, Surface Lamination, Root Face, Bevel Angle	Visual, dimensional	100% by vendor	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report	W	RW	R
6.0	Galvanizing (If Applicable)	Pipe	Integrity of Galvanized Coating	---	Each Pipe	Relevant Code & Technical Specification	As per code & Technical Specification	Inspection Report	P	R	R
	Legends/Notes:										
.	W-witness, R-Review, RW- Minimum 10% witness and 100% Review ,										

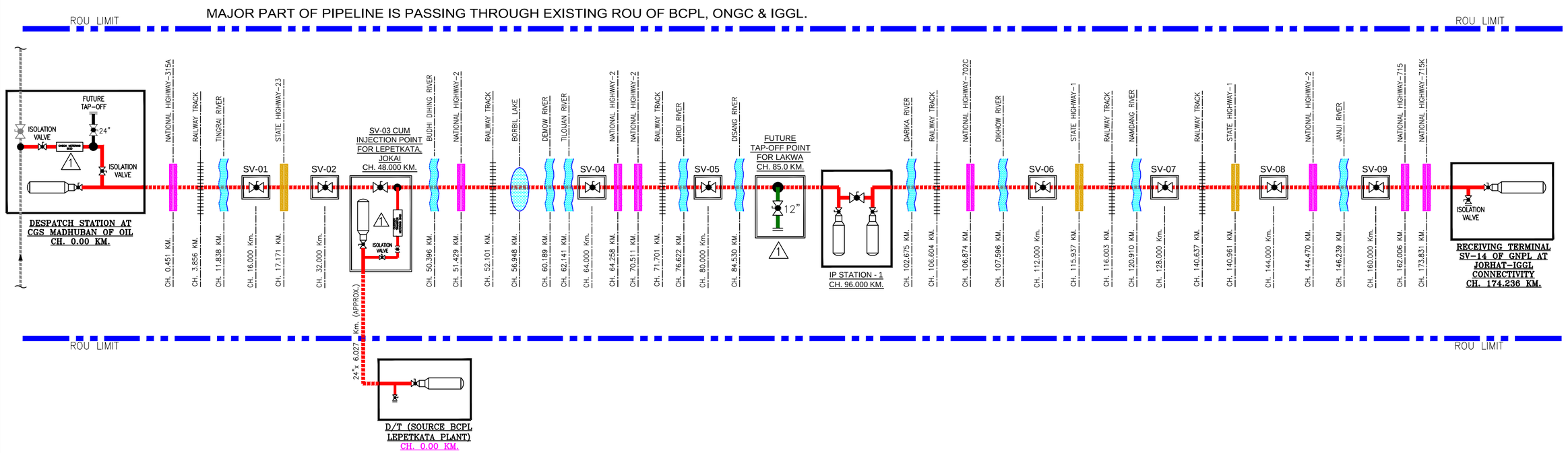
14.0 SCHEMATIC ROUTE DIAGRAM

(Appendix-IV to Particular Job Specification of Work)

DRG. DRG. NO. MEC/05/28/E/0085/M/1021

SCHEMATIC ROUTE DIAGRAM FOR DULIAJAN FEEDER LINE

24"NB Ø x 174.236 Km. DULIAJAN FEEDER LINE(FROM CGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY) & 24"NB Ø x 6.027 Km. APPROX. (FROM BCPL LEPETKATA SOURCE TO LEPETKATA INJECTION POINT)



LEGEND

- 24"Ø PROPOSED PIPELINE
- RIVER
- NATIONAL HIGHWAY
- STATE HIGHWAY
- RAILWAY LINE
- LAKE

RT : RECEIVING TERMINAL
DT : DESPATCH TERMINAL
TOP : TAP-OFF POINT
IP : INTERMEDIATE PIGGING STATION
SV: SECTIONALISING VALVE STATION

DULIAJAN TO JORHAT

SL. NO.	DESCRIPTION	QUANTITY
01	RAILWAY CROSSING	06 NOS.
02	NATIONAL HIGHWAY	08 NOS.
03	STATE HIGHWAY	03 NOS.
04	RIVER	10 NOS.
05	LAKE	01 NO.
06	NALA/DRAIN	80 NOS.
07	POND	28 NOS.
08	BT, WBM, CC ROAD	117 NOS.

LEPETKATA SOURCE TO INJECTION POINT

SL. NO.	DESCRIPTION	QUANTITY
01	NALA	04 NOS.
02	BT ROAD	02 NOS.

△1

SL. NO.	DESCRIPTION	SIZE	LENGTH (IN KM.)	DT	RT	IP	INJECTION POINT CUM R/T	FUTURE TAP-OFF	SV STATION
01	(FROM CGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)	24"	174.236	01	01	01	–	01	09*
02	INJECTION POINT FOR LEPETKATA, JOKAI TO SOURCE BCPL LEPETKATA PLANT	24"	6.027	01	–	–	01*	–	–

* THE SV-03 OF DFL LINE AND R/T CUM INJECTION POINT FOR LEPETKATA ARE ENVISAGED IN THE SAME PLOT.

NOTES :-
1. THE ABOVE DRAWING HAS BEEN PREPARED ON THE BASIS OF REVISED SURVEY & PDI DATA PROVIDED BY M/s IGGL. VIDE EMAIL DATED 29.04.2026.
2. CROSSINGS SHOWN IN SCHEMATIC DIAGRAM ARE IN-LINE WITH IGGL EMAIL DATED 15.05.2026.
3. THE PAVOJAN TAP-OFF POINT HAS BEEN CONSIDERED AT D/T CGS MADHUBAN IN-LINE WITH MEETING DATED 12.05.2026.
4. LOCATION OF SV'S IS TENTATIVE AND ONLY FOR PLANNING PURPOSE.
5. FOR PLACEMENT OF SV'S NO CONSIDERATION HAS BEEN GIVEN TO NEAREST APPROACH ROAD IN LINE WITH DISCUSSION WITH IGGL. FINAL LOCATION OF SV SHALL BE DECIDED BY IGGL IN LINE WITH CODE PROMISIONS.

REV NO.	DATE	DESCRIPTION	BY	VERIFIED
△1	18.07.26	REVISED AS MARKED AS PER REVISED P&ID (R-2)	VIKASH	R.BAJAJ

REVISION

REV / SEC — CONCURRED BY

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INDRADHANUSH GAS GRID LTD.
मेकॉन लिमिटेड
MECON LIMITED

SECTION	OIL & GAS
LOCATION	DELHI
DESIGNED	VIKASH
DRAWN	SUNIL
CHECKED AND VERIFIED	RAJNISH BAJAJ
REFERENCES	DOC NO./DRG. NO.
APPROVED	SIG (S. GUPTA)
	DATE 19.05.2026

DULIAJAN FEEDER LINE (DFL)

SCHEMATIC ROUTE DIAGRAM

SCALE : N.T.S | SH. 1 OF 1 | REV

DRG. NO. MEC/05/28/E/0085/M/1021 | 1

15.0 VIDEOGRAPHY SURVEY

(Appendix-V to Particular Job Specification of Work)

APPENDIX V – VIDEOGRAPHY SURVEY

1.0 INTRODUCTION

The purpose of video survey is to capture before starting construction activities the ground realities along the pipeline route and to co-relate the same with digitised maps of Survey of India. Moreover, during construction activities the Contractor shall video report at least once a week all site activities.

2.0 PROJECT DESCRIPTION

Approximate Length and Size of Pipeline: As per Scope of work defined elsewhere.

3.0 SCOPE OF WORK

Contractor or the approved agency (by Owner / Engineer) shall carry out the videography along the route of the pipeline.

The work will be subdivided in two phases:

Phase1: Videography of the entire route prior to any construction activities

A) The contractor shall capture the video for the following areas but not limited to:

1. Pipeline route
2. Location of various Stations and Tap Off points.
3. Major features such as water bodies, plantation, flora & fauna, forest,
4. All Crossings like road, railways, river, canal, khadi etc.
5. The photographs of the major crossing like river, railways, highways both upstream and downstream of the pipeline. The photographs and video should cover the type of soil and terrain condition, obstacles, rocks etc.

B) The identified locations on digitised map of Survey of India shall be interfaced with Videography through software whereby one can access both simultaneously and match the two. The identified locations like
Crossings: National Highways, State Highways, Rivers, Major Canals, Hills, Major Khadi
Areas: Rocky, Marshy, Forest, Plantation.

The digitised map shall be procured from Survey of India by the Contractor. Digital theodolite shall be used for all surveys. However, IGGL will provide all possible help in collection of required map, and Authorisation letter required, if any to contractor.

C) There is no need to carry out videography of the route if there is no change in topographical features. Such areas should highlight at end and starting point in videography.

Phase 2: Videography during Construction activities

During construction, the Contractor shall video survey all distinct / main activities under progress alongside the entire pipeline routing.

The purpose of this survey is to get a complete videography of the construction site at different stages of the construction.

This includes all main activities as per phased working procedure. Each phase of the construction shall be at least surveyed at 5 different locations distributed equally along the pipeline routing.

Each Natural Gas station will be also surveyed on the same way. Contractor shall submit his planning and his methodology to Owner /Engineer approval right after the LOA.

3.1 The proper log of the location, landmark, crossings, town, districts and important comments will be embedded.

3.2 The search will be text based and it will retrieve the relevant video segment along with textual / visual data for reference.

3.3 A special programme will be written which will help create interface through which the video of important landmarks can be searched /viewed.

3.4 Narration in back side of video will be provided along the route.

3.5 The Contractor shall hand over

USB Drive : 6 Nos. Phase 1

USB Drive : 6 Nos. Phase 2

4.0 ASSISTANCE

The Contractor to indicate in detail the information and assistance as required from client to execute the survey.

5.0 TIME OF WORK

One month for phase 1
Construction period for phase 2

6.0 PRICE SCHEDULE

Contractor to quote for each phase its lump sum fee on per Km of route survey basis. The fees shall include all expenses and cost of facilities used to carry out the scope covered in clauses above. Contractor to quote separate item as stated in Schedule of Rates (SOR). Price will be indicated under Schedule of Rate (SOR).

16.0 THIRD PARTY INSPECTION AGENCY

(Appendix-VI to Particular Job Specification of Work)

APPENDIX - VI

THIRD PARTY INSPECTION AGENCY

Contractor shall appoint anyone of the following TPIA for inspection purpose, wherever required as per tender document. Vendor has to intimate the TPIA name from below listed agencies to IGGL/ MECON prior to performing any inspection activity.

Contractor may propose any of the following TPIA:

i) Société Générale de Surveillance (SGS)
ii) Gulf Lloyds Industrial Services (India) Pvt. Ltd (GLISPL)
iii) International Certification Services (ICS)
iv) Bureau Veritas (Ind.) Pvt. Ltd (BVIS)
v) DNV GL
vi) TUV Rheinland (India) Pvt. Ltd.
vii) TÜV SÜD South Asia Pvt. Ltd.
viii) TUV India Pvt. Ltd. (TÜV Nord Group)
ix) Intertek India Pvt. Ltd.
x) Moody International (India) Pvt. Ltd.
xi) RINA India Pvt. Ltd.
xii) Tata Projects Ltd.
xiii) Competent Inspectorate and Consultants LLP
xiv) Apave TIV India Pvt. Ltd. [formerly known as ABS Industrial Verification (India) Pvt. Ltd.]

In case of any updation in TPIA list, the same shall be intimated to successful bidder.

Apart from inspection by TPIA, inspection shall also be performed by IGGL and or its authorized representative / MECON and or its authorized inspection agency (AIA).

Bidder shall provide separate office along with desktop, furniture for IGGL and MECON/ TPIA personnel for entire duration of the inspection. Office shall have table/ Chair/internet connectivity/stationary/courier and printing facilities for inspection officers.

17.0 AIR SURVEILLANCE

(Appendix-VII to Particular Job Specification of Work)

(VOID)

18.0 LIST OF CROSSINGS INDICATING PROPOSED CROSSING METHODOLOGY

(Appendix-VIII to Particular Job Specification of Work)

INDRADHANUSH GAS GRID LIMITED

DETAILED ENGINEERING SURVEY FOR PROPOSED ROUTE SECTION FROM PROPOSED DISPATCH TERMINAL STATION OF IGGL/CGGS MADHUBAN OF OIL TO SV-14, GNPL OF IGGL (DULIAJAN FEEDER LINE)

DETAIL ROUTE SURVEY REPORT

LIST OF ALL CROSSINGS FALLING ON THE ROUTE OF THE PIPELINE

Sl. No.	Cs. No.	Type of Crossing	Chainage (Km)	Description	Crossing Width (m)	Row Width (m)	Proposed Methodology	Remarks
1	CS-1	OIL INDIA	00+202.59	OIL INDIA LTD PIPELINE	1.00	15.00	Open cut	
2		DNPL PIPELINE	00+207.59	DNPL PIPELINE	1.00		Open cut	
3	-	11 KV POWER LINE	00+439.94	11 KV POWER LINE	0.00	-	Open cut	
4	CS-2	NH-315A	00+448.06	SUKIA-DULIAJAN ROAD (NH	7.00	20.00	HDD	
5	CS-3	OIL INDIA	00+455.28	OIL INDIA LTD PIPELINE	1.00	15.00	Open cut	
6		DNPL PIPELINE	00+460.28	DNPL PIPELINE	1.00		Open cut	
7	-	NALA	00+540.85	NALA	3.50	-	Open cut	
8	-	NALA	00+648.71	NALA	2.00	-	Open cut	
9	-	NALA	00+853.21	NALA	2.50	-	Open cut	
10	-	NALA	00+989.60	NALA	3.00	-	Open cut	
11	CS-4	BCPL PIPELINE	01+052.56	BCPL PIPELINE	1.00	20.00	Open cut	
12		BCPL PIPELINE	01+054.19	BCPL PIPELINE	1.00		Open cut	
13	-	NALA	01+300.64	NALA	5.00	-	Open cut	
14	-	NALA	01+357.44	NALA	7.50	-	Open cut	
15	CS-5	OIL INDIA	01+571.73	OIL INDIA LTD PIPELINE	1.00	20.00	Open cut	
16		DNPL PIPELINE	01+576.73	DNPL PIPELINE	1.00		Open cut	
17	CS-6	BCPL PIPELINE	01+653.37	BCPL PIPELINE	1.00	20.00	Open cut	
18		BCPL PIPELINE	01+654.67	BCPL PIPELINE	1.00		Open cut	
19	-	230V ELECTRIC POWER LINE	01+760.17	230V ELECTRIC POWER LINE	0.00	-	Open cut	
20	-	11 KV POWER LINE	01+762.63	11 KV POWER LINE	0.00	-	Open cut	
21	-	CC ROAD	02+051.57	TO DULIAJAN NO.1 ROAD	4.00	-	HDD	
22	CS-7	WATER PIPELINE	02+055.53	WATER PIPELINE	1.00	1.00	Open cut	
23	-	11 KV POWER LINE	02+074.69	11 KV POWER LINE	0.00	-	Open cut	
24	CS-8	BCPL PIPELINE	02+102.30	BCPL PIPELINE	1.00	20.00	Open cut	
25		BCPL PIPELINE	02+103.23	BCPL PIPELINE	1.00		Open cut	
26	-	NALA	02+199.34	NALA	6.00	-	Open cut	
27	-	NALA	02+773.06	NALA	3.00	-	Open cut	
28	-	CART TRACK	02+796.62	TO FIELD ROAD	3.00	-	Open cut	
29	CS-9	BCPL PIPELINE	02+805.10	BCPL PIPELINE	1.00	20.00	Open cut	
30		BCPL PIPELINE	02+806.78	BCPL PIPELINE	1.00		Open cut	
31	-	CART TRACK	03+211.25	TO FIELD ROAD	3.00	-	Open cut	
32	CS-10	BCPL PIPELINE	03+337.88	BCPL PIPELINE	1.00	20.00	Open cut	
33		BCPL PIPELINE	03+339.46	BCPL PIPELINE	1.00		Open cut	
34	-	NALA	03+348.73	NALA	3.00	-	Open cut	

35	-	BT ROAD	03+354.33	TO TOPOVAN NAGAR	6.00	-	Open cut/ Zero HDD	
36	-	11 KV POWER LINE	03+357.84	11 KV POWER LINE	0.00	-	Open cut	
37	-	CART TRACK	03+478.55	TO FIELD ROAD	3.50	-	Open cut	
38	CS-11	BCPL PIPELINE	03+582.01	BCPL PIPELINE	1.00	20.00	Open cut	
39		BCPL PIPELINE	03+583.76	BCPL PIPELINE	1.00		Open cut	
40	-	NALA	03+842.80	NALA	8.00	-	Open cut	
41	CS-12	BCPL PIPELINE	03+845.47	BCPL PIPELINE	1.00	20.00	Open cut	
42		BCPL PIPELINE	03+846.84	BCPL PIPELINE	1.00		Open cut	
43	CS-13	RAILWAY LINE	03+858.07	RAILWAY LINE	1.68	18.00	HDD	
44	-	11 KV POWER LINE	04+040.92	11 KV POWER LINE	0.00	-	Open cut	
45	-	BT ROAD	04+045.17	TO ANANDAPARA ROAD	2.00	-	Open cut/ Zero HDD	
46	CS-14	OIL INDIA	04+411.40	OIL INDIA LTD PIPELINE	1.00	20.00	HDD	
47		DNPL PIPELINE	04+416.40	DNPL PIPELINE	1.00		Open cut	
48	-	CART TRACK	04+415.75	TO FIELD ROAD	2.50	-	Open cut	
49	-	NALA	05+564.48	NALA	4.50	-	Open cut	
50	-	BT ROAD	05+573.92	TO BALIJAN T.E. 5/54 NO.1 ROAD	3.00	-	Open cut/ Zero HDD	
51	-	11 KV POWER LINE	05+624.28	11 KV POWER LINE	0.00	-	Open cut	
52	-	BRICK ROAD	05+625.96	TO FIELD ROAD	2.50	-	Open cut	
53	-	NALA	05+628.91	NALA	2.50	-	Open cut	
54	-	NALA	05+913.79	NALA	10.00	-	Open cut	
55	-	230V ELECTRIC POWER LINE	07+066.87	230V ELECTRIC POWER LINE	0.00	-	Open cut	
56	-	11 KV POWER LINE	07+069.66	11 KV POWER LINE	0.00	-	Open cut	
57	-	11 KV POWER LINE	07+149.22	11 KV POWER LINE	0.00	-	Open cut	
58	-	BT ROAD	07+151.90	TO HATIGARH BALIJAN ROAD	3.00	-	Open cut/ Zero HDD	
59	CS-15	BCPL PIPELINE	07+874.67	BCPL PIPELINE	1.00	20.00	Open cut	
60		BCPL PIPELINE	07+880.27	BCPL PIPELINE	1.00		Open cut	
61	-	WBM ROAD	08+059.64	TO FIELD ROAD	24.00	-	Open cut	
62	-	CART TRACK	08+114.69	TO FIELD ROAD	3.00	-	Open cut	
63	-	CART TRACK	08+186.83	TO FIELD ROAD	3.50	-	Open cut	
64	-	BRICK ROAD	08+417.27	TO FIELD ROAD	7.00	-	Open cut	
65	-	NALA	08+596.88	NALA	4.00	-	Open cut	
66	-	CART TRACK	08+634.31	TO FIELD ROAD	3.00	-	Open cut	
67	CS-16	BCPL PIPELINE	08+860.70	BCPL PIPELINE	1.00	20.00	Open cut	
68		BCPL PIPELINE	08+862.27	BCPL PIPELINE	1.00		Open cut	
69	-	NALA	09+398.31	NALA	4.50	-	Open cut	
70	-	CART TRACK	09+431.14	TO FIELD ROAD	2.00	-	Open cut	
71	-	CART TRACK	09+548.74	TO FIELD ROAD	3.50	-	Open cut	
72	-	CART TRACK	09+669.22	TO FIELD ROAD	4.00	-	Open cut	
73	-	CART TRACK	09+788.80	TO FIELD ROAD	2.00	-	Open cut	
74	-	CART TRACK	09+909.82	TO FIELD ROAD	3.50	-	Open cut	
75	-	CART TRACK	10+030.22	TO FIELD ROAD	2.00	-	Open cut	
76	-	CART TRACK	10+150.57	TO FIELD ROAD	3.50	-	Open cut	
77	-	CART TRACK	10+445.84	TO FIELD ROAD	10.00	-	Open cut	

78	-	CART TRACK	10+470.91	TO FIELD ROAD	2.50	-	Open cut	
79	-	NALA	10+641.19	NALA	6.50	-	Open cut	
80	-	230V ELECTRIC POWER LINE	10+653.23	230V ELECTRIC POWER LINE	0.00	-	Open cut	
81	CS-17	MDR ROAD	10+682.05	TO NAU-PUKHRI ROAD	5.00	12.00	HDD	
82	-	CART TRACK	10+882.61	TO FIELD ROAD	4.00	-	Open cut	
83	-	11 KV POWER LINE	11+112.33	11 KV POWER LINE	0.00	-	Open cut	
84	-	CART TRACK	11+138.67	TO FIELD ROAD	6.00	-	Open cut	
85	CS-18	TINGRAI RIVER	11+822.84	TINGRAI RIVER	30.00	300.00	HDD	
86	-	WBM ROAD	11+998.63	TO FIELD ROAD	3.00	-	Open Cut/ Zero HDD	
87	-	WBM ROAD	12+110.63	TO FIELD ROAD	3.00	-	Open Cut/ Zero HDD	
88	-	WBM ROAD	12+182.94	TO FIELD ROAD	3.00	-	Open Cut/ Zero HDD	
89	-	WBM ROAD	12+236.10	TO FIELD ROAD	3.00	-	Open Cut/ Zero HDD	
90	-	BRICK ROAD	12+314.82	TO PHUKAN BARI T.E NO 25 ROAD	5.50	-	Open cut	
91	-	NALA	13+170.13	NALA	3.00	-	Open cut	
92	-	NALA	13+540.82	NALA	5.00	-	Open cut	
93	-	NALA	13+580.91	NALA	5.50	-	Open cut	
94	-	BRICK ROAD	14+016.32	TO BORHULA KACHARI ROAD	4.00	-	Open cut	
95	-	BRICK ROAD	14+080.52	TO BORHULA KACHARI ROAD	7.00	-	Open cut	
96	-	BT ROAD	14+655.61	TO GHAHI GAON ROAD	3.00	-	Open cut/ Zero HDD	
97	CS-19	WATER PIPELINE	14+658.70	WATER PIPELINE	1.00	1.00	Open cut	
98	-	11 KV POWER LINE	14+671.44	11 KV POWER LINE	0.00	-	Open cut	
99	-	NALA	15+871.88	NALA	8.50	-	Open cut	
100	-	NALA	16+002.96	NALA	8.00	-	Open cut	
101	CS-20	AGCL PIPELINE	17+173.30	ASSAM GAS COMPANY LIMITED	1.00	20.00	Open cut	
102	CS-21	SH-23	17+181.21	TO LAHOAL-DULIAJAN ROAD	7.00	12.00	HDD	
103	-	POND	17+540.74	POND	17.00	-	Open cut	
104	-	BT ROAD	17+747.23	TO KAPAHUA GAON ROAD	4.00	-	Open cut/ Zero HDD	
105	-	BT ROAD	18+255.75	TO TENGAKHAT ROAD	5.00	-	Open cut/ Zero HDD	
106	-	BRICK ROAD	19+444.11	TO FIELD ROAD	4.00	-	Open cut	
107	-	230V ELECTRIC POWER LINE	19+444.41	230V ELECTRIC POWER LINE	0.00	-	Open cut	
108	-	CART TRACK	20+364.81	TO FIELD ROAD	3.00	-	Open cut	
109	-	CART TRACK	20+871.15	TO FIELD ROAD	2.50	-	Open cut	
110	-	11 KV POWER LINE	21+046.12	11 KV POWER LINE	0.00	-	Open cut	
111	-	POND	21+069.01	POND	21.50	-	Open cut/ HDD	
112	-	11 KV POWER LINE	21+188.24	11 KV POWER LINE	0.00	-	Open cut	
113	-	11 KV POWER LINE	21+223.04	11 KV POWER LINE	0.00	-	Open cut	
114	-	BT ROAD	21+548.55	TO DEOBIL GAON ROAD	5.50	-	Open cut/ Zero HDD	
115	-	NALA	21+850.04	NALA	7.50	-	Open cut	
116	-	CART TRACK	22+729.31	TO FIELD ROAD	4.00	-	Open cut	
117	-	NALA	23+255.82	NALA	11.00	-	Open cut	
118	-	WBM ROAD	23+266.95	TO BORDOLONI - DIGHALIA ROAD	3.00	-	Open cut	
119	CS-22	WATER PIPELINE	23+273.25	WATER PIPELINE	1.00	1.00	Open cut	
120	-	NALA	23+739.06	NALA	13.00	-	Open cut	

121	-	BT ROAD	24+080.19	TO BORDOLONI - DIGHALIA RD	5.00	-	Open cut/ Zero HDD	
122	-	11 KV POWER LINE	24+083.49	11 KV POWER LINE	0.00	-	Open cut	
123	-	11 KV POWER LINE	24+099.68	11 KV POWER LINE	0.00	-	Open cut	
124	-	11 KV POWER LINE	24+211.18	11 KV POWER LINE	0.00	-	Open cut	
125	-	BRICK ROAD	24+230.57	TO FIELD ROAD	3.00	-	Open cut	
126	-	230V ELECTRIC POWER LINE	24+233.24	230V ELECTRIC POWER LINE	0.00	-	Open cut	
127	-	CART TRACK	24+921.83	TO FIELD ROAD	6.00	-	Open cut	
128	-	NALA	24+932.66	NALA	4.50	-	Open cut	
129	-	CART TRACK	25+500.76	TO FIELD ROAD	29.50	-	Open cut	
130	-	CART TRACK	25+522.32	TO FIELD ROAD	3.50	-	Open cut	
131	CS-23	WATER PIPELINE	25+538.57	WATER PIPELINE	1.00	1.00	Open cut	
132	-	CART TRACK	25+935.70	TO FIELD ROAD	24.00	-	Open cut	
133	-	NALA	26+065.05	NALA	4.50	-	Open cut	
134	-	WBM ROAD	26+280.29	TO FIELD ROAD	2.00	-	Open cut	
135	CS-24	WATER PIPELINE	26+380.04	WATER PIPELINE	1.00	1.00	Open cut	
136	-	BT ROAD	26+396.03	TO KATHALONI OCS ROAD	8.00	-	Open cut/ Zero HDD	
137	CS-25	WATER PIPELINE	26+966.38	WATER PIPELINE	1.00	1.00	Open cut	
138	-	11 KV POWER LINE	26+968.07	11 KV POWER LINE	0.00	-	Open cut	
139	-	BT ROAD	26+987.63	TO KATHALONI OCS ROAD	4.50	-	Open cut/ Zero HDD	
140	-	CART TRACK	27+037.14	TO FIELD ROAD	5.00	-	Open cut	
141	-	11 KV POWER LINE	27+166.83	11 KV POWER LINE	0.00	-	Open cut	
142	-	BT ROAD	27+171.96	TO CHIRING HULA NO.1 ROAD	6.50	-	Open cut/ Zero HDD	
143	-	230V ELECTRIC POWER LINE	27+465.42	230V ELECTRIC POWER LINE	0.00	-	Open cut	
144	-	CART TRACK	27+466.71	TO FIELD ROAD	3.50	-	Open cut	
145	-	230V ELECTRIC POWER LINE	27+591.43	230V ELECTRIC POWER LINE	0.00	-	Open cut	
146	-	BRICK ROAD	27+594.15	TO FIELD ROAD	5.50	-	Open cut	
147	-	CART TRACK	28+034.73	TO FIELD ROAD	4.00	-	Open cut	
148	-	230V ELECTRIC POWER LINE	28+175.48	230V ELECTRIC POWER LINE	0.00	-	Open cut	
149	-	BT ROAD	28+179.20	TO CHIRING HULA NO.1 ROAD	5.00	-	Open cut/ Zero HDD	
150	-	11 KV POWER LINE	28+419.08	11 KV POWER LINE	0.00	-	Open cut	
151	-	POND	29+087.23	POND	36.50	-	Open cut/ HDD	
152	-	11 KV POWER LINE	29+324.49	11 KV POWER LINE	0.00	-	Open cut	
153	-	BT ROAD	29+331.51	TO ROMAI BONGALI ROAD	6.50	-	Open cut/ Zero HDD	
154	-	11 KV POWER LINE	29+535.79	11 KV POWER LINE	0.00	-	Open cut	
155	-	11 KV POWER LINE	30+851.88	11 KV POWER LINE	0.00	-	Open cut	
156	-	NALA	30+946.82	NALA	16.00	-	Open cut	
157	-	BRICK ROAD	31+274.47	TO ROMAI T.E FACTORY ROAD	4.00	-	Open cut	
158	-	11 KV POWER LINE	31+333.23	11 KV POWER LINE	0.00	-	Open cut	
159	-	NALA	32+199.89	NALA	10.50	-	Open cut	
160	-	11 KV POWER LINE	32+206.21	11 KV POWER LINE	0.00	-	Open cut	
161	-	BT ROAD	32+221.27	TO GHORAMARA ROAD	4.00	-	Open cut/ Zero HDD	
162	-	POND	32+616.94	POND	48.00	-	HDD	
163	CS-26	NALA	32+871.21	NALA	55.00	63.50	HDD	

164	-	CART TRACK	33+068.79	TO GHOGRAJAN ROAD	3.00	-	Open cut	
165	-	BT ROAD	33+222.09	TO SV-1 GHORAMARA STATION	3.00	-	Open cut/ Zero HDD	
166	-	NALA	33+374.83	NALA	12.00	-	Open cut	
167	-	NALA	33+870.90	NALA	12.50	-	Open cut	
168	CS-27	NALA	33+923.32	NALA	17.00	22.00	Open cut/ HDD	
169	CS-28	NALA	34+270.84	NALA	22.00	25.00	Open cut/ HDD	
170	-	NALA	34+983.92	NALA	3.50	-	Open cut	
171	-	BT ROAD	34+988.71	TO FIELD ROAD	3.00	-	Open cut/ Zero HDD	
172	-	NALA	34+992.06	NALA	2.00	-	Open cut	
173	-	NALA	35+947.24	NALA	20.50	-	Open cut	
174	-	NALA	36+335.26	NALA	15.50	-	Open cut	
175	-	NALA	36+611.77	NALA	3.50	-	Open cut	
176	-	CART TRACK	36+616.70	TO FIELD ROAD	2.50	-	Open cut	
177	-	230V ELECTRIC POWER LINE	37+038.67	230V ELECTRIC POWER LINE	0.00	-	Open cut	
178	-	CART TRACK	37+045.91	TO DHARIATOLI GAON ROAD	5.00	-	Open cut	
179	-	11 KV POWER LINE	37+050.82	11 KV POWER LINE	0.00	-	Open cut	
180	-	NALA	37+734.83	NALA	12.00	-	Open cut	
181	-	CART TRACK	37+939.85	TO KAMAKHYA GAON ROAD	3.00	-	Open cut	
182	-	RJIL OFC	37+943.72	RJIL OFC	1.00	-	Open cut	
183	CS-29	NALA	39+226.90	NALA	30.00	44.00	HDD	
184	-	230V ELECTRIC POWER LINE	39+345.20	230V ELECTRIC POWER LINE	0.00	-	Open cut	
185	-	CART TRACK	39+350.36	TO FIELD ROAD	4.50	-	Open cut	
186	-	CART TRACK	40+329.73	TO FIELD ROAD	3.50	-	Open cut	
187	-	230V ELECTRIC POWER LINE	40+332.15	230V ELECTRIC POWER LINE	0.00	-	Open cut	
188	-	CART TRACK	40+336.80	TO CHANGAMARI GAON ROAD	5.00	-	Open cut	
189	-	RJIL OFC	40+341.25	RJIL OFC	1.00	-	Open cut	
190	-	WBM ROAD	40+381.07	TO FIELD ROAD	2.00	-	Open cut	
191	-	11 KV POWER LINE	40+482.95	11 KV POWER LINE	0.00	-	Open cut	
192	-	POND	40+587.65	POND	51.50	-	HDD	
193	CS-30	MDR ROAD	40+844.42	TO HANCHARA GAON ROAD	4.50	16.00	Open cut	
194	-	11 KV POWER LINE	40+863.06	11 KV POWER LINE	0.00	-	Open cut	
195	-	11 KV POWER LINE	41+040.24	11 KV POWER LINE	0.00	-	Open cut	
196	-	11 KV POWER LINE	41+079.68	11 KV POWER LINE	0.00	-	Open cut	
197	-	BRICK ROAD	41+370.06	TO HANCHARA GAON ROAD	4.50	-	Open cut	
198	CS-31	MDR ROAD	43+462.93	TO DIHING THAKERANI GAON ROAD	7.00	12.00	Open cut	
199	CS-32	BCPL PIPELINE	43+466.54	BCPL PIPELINE	1.00	20.00	Open cut	
200		BCPL PIPELINE	43+467.34	BCPL PIPELINE	1.00		Open cut	
201	-	11 KV POWER LINE	43+485.46	11 KV POWER LINE	0.00	-	Open cut	
202	-	BT ROAD	43+936.06	TO FIELD ROAD	3.00	-	Open cut/ Zero HDD	
203	-	11 KV POWER LINE	43+939.27	11 KV POWER LINE	0.00	-	Open cut	
204	CS-33	NALA	44+449.33	NALA	20.00	22.00	Open cut/ HDD	
205	-	BRICK ROAD	45+349.47	TO KOWAR KHARONI ROAD	3.00	-	Open cut	
206	-	POND	45+455.78	POND	47.50	-	HDD	

207	-	BRICK ROAD	46+449.89	TO KOWAR KHARONI ROAD	5.50	-	Open cut	
208	-	BRICK ROAD	46+868.40	TO MOWAMORA GAON NO 2 ROAD	6.50	-	Open cut	
209	-	NALA	47+389.68	NALA	3.50	-	Open cut	
210	-	230V ELECTRIC POWER LINE	48+640.10	230V ELECTRIC POWER LINE	0.00	-	Open cut	
211	-	CART TRACK	48+643.95	TO FIELD ROAD	2.00	-	Open cut	
212	-	CART TRACK	49+267.55	TO MANCOTTA ROAD	26.50	-	Open cut	
213	CS-34	BUDHI DIHING RIVER	50+423.14	BUDHI DIHING RIVER	300.00	530.00	HDD	
214	-	CART TRACK	50+951.61	TO FIELD ROAD	2.00	-	Open cut	
215	-	POND	51+113.88	POND	43.50	-	HDD	
216	-	132 KV HT POWER LINE	51+208.16	132 KV HT POWER LINE	0.00	-	Open cut	
217	-	VIL OFC	51+428.48	VIL OFC	1.00	-	Open cut	
218	CS-35	NH-2	51+454.27	TO KHOWANG CHARIALI ROAD	24.00	60.00	HDD	
219	-	POND	51+656.90	POND	37.50	-	Open cut/ HDD	
220	-	POND	51+716.55	POND	18.00	-	Open cut	
221	-	230V ELECTRIC POWER LINE	51+800.95	230V ELECTRIC POWER LINE	0.00	-	Open cut	
222	-	CC ROAD	51+804.34	TO ASSAM TRUNK ROAD	3.50	-	HDD	
223	-	CART TRACK	51+805.20	TO FIELD ROAD	3.50	-	Open cut	
224	-	POND	51+835.91	POND	33.50	-	Open cut/ HDD	
225	CS-36	RAILWAY LINE	52+122.44	RAILWAY LINE	1.68	24.00	HDD	
226	-	CART TRACK	53+967.61	TO FIELD ROAD	2.00	-	Open cut	
227	-	BT ROAD	54+226.66	TO GOROIMARI ROAD	5.50	-	Open cut/ Zero HDD	
228	-	BT ROAD	54+435.31	TO KHOWANG ROAD	2.00	-	Open cut/ Zero HDD	
229	-	BRICK ROAD	55+126.70	TO KHOWANG ROAD	3.00	-	Open cut	
230	-	CART TRACK	55+475.66	TO KAWOIMARI N.C. ROAD	4.50	-	Open cut	
231	-	NALA	55+935.54	NALA	54.50	-	HDD	
232	-	230V ELECTRIC POWER LINE	55+994.53	230V ELECTRIC POWER LINE	0.00	-	Open cut	
233	-	BRICK ROAD	56+001.07	TO GOROIMARI ROAD	4.00	-	Open cut	
234	CS-37	BORBIL LAKE	56+974.08	KHOWANG BORBIL LAKE	250.00	320.00	HDD	
235	-	BT ROAD	57+114.03	TO DIHING KAIBATRA GAON ROAD	3.00	-	Open cut/ Zero HDD	
236	-	CART TRACK	57+548.52	TO FIELD ROAD	2.00	-	Open cut	
237	-	POND	57+727.22	POND	16.50	-	Open cut	
238	-	BRICK ROAD	57+774.63	TO FIELD ROAD	2.50	-	Open cut	
239	-	230V ELECTRIC POWER LINE	57+776.33	230V ELECTRIC POWER LINE	0.00	-	Open cut	
240	-	POND	58+200.09	POND	16.00	-	Open cut	
241	-	BT ROAD	58+417.32	TO NITAIPUKHURI ROAD	4.50	-	Open cut/ Zero HDD	
242	-	230V ELECTRIC POWER LINE	58+419.12	230V ELECTRIC POWER LINE	0.00	-	Open cut	
243	-	NALA	58+421.79	NALA	2.00	-	Open cut	
244	-	132KV ELECTRIC POWER LINE	58+429.53	132KV ELECTRIC POWER LINE	0.00	-	Open cut	
245	-	CART TRACK	58+705.64	TO FIELD ROAD	4.50	-	Open cut	
246	-	CART TRACK	58+932.07	TO FIELD ROAD	4.00	-	Open cut	
247	-	CART TRACK	59+415.83	TO FIELD ROAD	2.00	-	Open cut	
248	CS-38	MDR ROAD	59+621.07	TO KOWANG ROAD	6.00	12.00	Open cut	
249	-	230V ELECTRIC POWER LINE	59+624.76	230V ELECTRIC POWER LINE	0.00	-	Open cut	

250	-	CART TRACK	60+088.05	TO FIELD ROAD	2.00	-	Open cut	
251	-	230V ELECTRIC POWER LINE	60+112.40	230V ELECTRIC POWER LINE	0.00	-	Open cut	
252	CS-39	DEMOW RIVER	60+216.04	DEMOW RIVER	22.00	43.00	HDD	
253	-	CART TRACK	60+276.73	TO FIELD ROAD	3.50	-	Open cut	
254	-	BRICK ROAD	61+419.63	TO MADHAKOLI GRANT NO.128 ROAD	4.50	-	Open cut	
255	-	WBM ROAD	62+022.34	TO FIELD ROAD	4.00	-	Open cut	
256	CS-40	TILOIJAN RIVER	62+166.65	TILOIJAN RIVER	18.00	30.00	HDD	
257	-	BT ROAD	62+602.50	TO MADHAKALI NO.3 ROAD	3.50	-	Open cut/ Zero HDD	
258	-	11 KV POWER LINE	62+605.45	11 KV POWER LINE	0.00	-	Open cut	
259	-	NALA	62+611.16	NALA	3.00	-	Open cut	
260	-	NALA	63+495.00	NALA	7.50	-	Open cut	
261	-	NALA	63+601.60	NALA	5.50	-	Open cut	
262	-	BT ROAD	63+638.80	TO MADHAKALI NO.3	6.50	-	Open cut/ Zero HDD	
263	-	11 KV POWER LINE	63+658.32	11 KV POWER LINE	0.00	-	Open cut	
264	CS-41	BCPL PIPELINE	63+868.79	BCPL PIPELINE	1.00	20.00	Open cut	
265	-	NALA	64+044.11	NALA	5.50	-	Open cut	
266	CS-42	NH-2	64+272.27	TO LUKUMAI NO.2 ROAD	22.00	60.00	HDD	
267	CS-43	BCPL PIPELINE	64+473.20	BCPL PIPELINE	1.00	20.00	Open cut	
268	-	BT ROAD	64+662.87	TOGOZPURIA BONGALI ROAD	5.00	-	Open cut/ Zero HDD	
269	-	BT ROAD	64+853.59	TO HUNGHUNGIA NO.2 ROAD	7.00	-	Open cut/ Zero HDD	
270	-	NALA	65+629.75	NALA	14.50	-	Open cut	
271	-	11 KV POWER LINE	66+126.79	11 KV POWER LINE	0.00	-	Open cut	
272	-	WBM ROAD	66+136.02	TO ROSHIPATHER NEPALI ROAD	9.00	-	Open cut	
273	-	CART TRACK	66+225.33	TO FIELD ROAD	3.00	-	Open cut	
274	-	WBM ROAD	67+005.97	TO FIELD ROAD	4.00	-	Open cut	
275	-	11 KV POWER LINE	67+027.54	11 KV POWER LINE	0.00	-	Open cut	
276	-	11 KV POWER LINE	67+147.45	11 KV POWER LINE	0.00	-	Open cut	
277	-	11 KV POWER LINE	67+645.40	11 KV POWER LINE	0.00	-	Open cut	
278	-	BRICK ROAD	67+667.73	TO DIKHARI MORAN NO.2 ROAD	4.00	-	Open cut	
279	-	POND	67+830.82	POND	16.00	-	Open cut	
280	-	NALA	67+981.55	NALA	11.00	-	Open cut	
281	-	NALA	68+422.07	NALA	8.00	-	Open cut	
282	-	NALA	68+556.32	NALA	4.00	-	Open cut	
283	-	BT ROAD	68+831.71	TO ASSAM TRUNK (NH2) ROAD	3.50	-	Open cut/ Zero HDD	
284	-	11 KV POWER LINE	68+835.75	11 KV POWER LINE	0.00	-	Open cut	
285	-	NALA	68+881.09	NALA	6.00	-	Open cut	
286	-	NALA	69+082.47	NALA	2.00	-	Open cut	
287	-	11 KV POWER LINE	69+111.41	11 KV POWER LINE	0.00	-	Open cut	
288	-	NALA	69+116.10	NALA	2.00	-	Open cut	
289	-	WBM ROAD	69+119.45	TO ASSAM TRUNK (NH2) ROAD	4.50	-	Open cut	
290	-	NALA	69+218.44	NALA	2.50	-	Open cut	
291	-	WBM ROAD	70+076.34	TO LACHIT NAGAR ROAD	5.00	-	Open cut	
292	-	11 KV POWER LINE	70+403.23	11 KV POWER LINE	0.00	-	Open cut	

293	CS-44	NH-215	70+506.41	TO MORANHAT TOWN ROAD	7.00	40.00	HDD	
294	-	11 KV POWER LINE	70+509.60	11 KV POWER LINE	0.00	-	Open cut	
295	-	POND	71+513.83	POND	85.00	-	HDD	
296	-	NALA	71+672.73	NALA	4.50	-	Open cut	
297	CS-45	RAILWAY LINE	71+690.46	RAILWAY LINE	1.68	24.00	HDD	
298	CS-46	BCPL PIPELINE	71+732.90	BCPL PIPELINE	1.00	20.00	Open cut	
299	-	11 KV POWER LINE	71+994.75	11 KV POWER LINE	0.00	-	Open cut	
300	-	NALA	72+168.11	NALA	3.50	-	Open cut	
301	CS-47	DNPL PIPELINE	72+187.36	DNPL PIPELINE	1.00	20.00	Open cut	
302		OIL INDIA	72+192.36	OIL INDIA LTD PIPELINE	1.00		Open cut	
303	CS-48	BCPL PIPELINE	72+241.74	BCPL PIPELINE	1.00	20.00	Open cut	
304	CS-49	MDR ROAD	72+299.51	TO OIL INDIA ROAD	3.50	12.00	Open cut	
305	-	BT ROAD	72+618.69	TO KHELMATI ROAD	2.50	-	Open cut/ Zero HDD	
306	-	BT ROAD	72+969.53	TO FIELD ROAD	2.00	-	Open cut/ Zero HDD	
307	-	NALA	73+072.22	NALA	3.00	-	Open cut	
308	-	BT ROAD	73+219.87	TO FIELD ROAD	3.50	-	Open cut/ Zero HDD	
309	-	WBM ROAD	73+328.49	TO FIELD ROAD	2.00	-	Open cut	
310	-	NALA	73+472.44	NALA	3.00	-	Open cut	
311	CS-50	GAS PIPELINE	73+488.90	GAS PIPELINE	1.00	15.00	Open cut	
312	-	CART TRACK	73+492.76	TO FIELD ROAD	2.00	-	Open cut	
313	-	NALA	73+499.75	NALA	3.00	-	Open cut	
314	CS-51	ONGC PIPELINE	73+582.06	ONGC PIPELINE	1.00	5.00	Open cut	
315	-	11 KV POWER LINE	73+608.09	11 KV POWER LINE	0.00	-	Open cut	
316	-	NALA	73+648.90	NALA	3.50	-	Open cut	
317	-	POND	73+970.65	POND	13.00	-	Open cut	
318	-	NALA	74+105.50	NALA	2.50	-	Open cut	
319	-	11 KV POWER LINE	74+424.50	11 KV POWER LINE	0.00	-	Open cut	
320	-	POND	74+449.59	POND	14.50	-	Open cut	
321	-	POND	74+490.25	POND	11.50	-	Open cut	
322	-	POND	74+514.24	POND	11.00	-	Open cut	
323	-	11 KV POWER LINE	74+704.33	11 KV POWER LINE	0.00	-	Open cut	
324	CS-52	WATER PIPELINE	74+952.27	WATER PIPELINE	1.00	1.00	Open cut	
325	-	BRICK ROAD	74+957.44	TO TANGANI HABI GAON ROAD	3.50	-	Open cut	
326	-	11 KV POWER LINE	74+997.06	11 KV POWER LINE	0.00	-	Open cut	
327	-	11 KV POWER LINE	75+015.15	11 KV POWER LINE	0.00	-	Open cut	
328	-	CART TRACK	75+049.04	TO FIELD ROAD	2.50	-	Open cut	
329	-	NALA	75+472.35	NALA	3.50	-	Open cut	
330	-	BRICK ROAD	75+544.20	TO FIELD ROAD	3.00	-	Open cut	
331	-	NALA	75+704.31	NALA	2.50	-	Open cut	
332	-	WBM ROAD	75+987.74	TO FIELD ROAD	3.50	-	Open cut	
333	-	WBM ROAD	75+996.69	TO FIELD ROAD	4.50	-	Open cut	
334	-	NALA	76+078.00	NALA	4.50	-	Open cut	
335	-	WBM ROAD	76+526.44	TO FIELD ROAD	3.00	-	Open cut	

336	CS-53	DIROI RIVER	76+600.58	DIROI RIVER	36.00	45.00	HDD	
337	-	CART TRACK	77+035.05	TO FIELD ROAD	3.00	-	Open cut	
338	-	11 KV POWER LINE	77+126.53	11 KV POWER LINE	0.00	-	Open cut	
339	-	BRICK ROAD	77+285.54	TO SEPON-SUFFRY ROAD	4.00	-	Open cut	
340	-	CART TRACK	77+839.31	TO FIELD ROAD	10.00	-	Open cut	
341	-	CART TRACK	77+885.38	TO FIELD ROAD	4.50	-	Open cut	
342	-	CART TRACK	77+922.94	TO FIELD ROAD	13.00	-	Open cut	
343	-	CART TRACK	78+244.68	TO FIELD ROAD	3.50	-	Open cut	
344	-	CART TRACK	78+732.78	TO FIELD ROAD	3.00	-	Open cut	
345	-	11 KV POWER LINE	78+852.63	11 KV POWER LINE	0.00	-	Open cut	
346	-	NALA	79+049.51	NALA	11.50	-	Open cut	
347	-	BT ROAD	79+175.85	TO DOBA TINI ALI ROAD	9.00	-	Open cut/ Zero HDD	
348	-	CART TRACK	79+207.07	TO FIELD ROAD	2.00	-	Open cut	
349	-	CART TRACK	79+958.62	TO FIELD ROAD	3.50	-	Open cut	
350	-	230V ELECTRIC POWER LINE	79+970.39	230V ELECTRIC POWER LINE	0.00	-	Open cut	
351	-	CART TRACK	80+228.79	TO FIELD ROAD	2.00	-	Open cut	
352	-	230V ELECTRIC POWER LINE	80+236.22	230V ELECTRIC POWER LINE	0.00	-	Open cut	
353	-	NALA	80+370.09	NALA	5.00	-	Open cut	
354	-	CART TRACK	80+492.65	TO FIELD ROAD	3.00	-	Open cut	
355	-	CART TRACK	80+757.38	TO FIELD ROAD	4.50	-	Open cut	
356	CS-54	MDR ROAD	81+137.39	TO DISANPANI-RAJGARH ROAD	4.00	12.00	Open cut	
357	-	BT ROAD	82+377.43	TO KHANGIA ROAD	5.00	-	Open cut/ Zero HDD	
358	-	CART TRACK	82+655.67	TO SEPON ROAD	9.50	-	Open cut	
359	-	CART TRACK	82+770.76	TO LAI CHENG GAON ROAD	3.50	-	Open cut	
360	-	CART TRACK	82+845.37	TO FIELD ROAD	3.50	-	Open cut	
361	-	230V ELECTRIC POWER LINE	82+850.32	230V ELECTRIC POWER LINE	0.00	-	Open cut	
362	-	CART TRACK	83+528.52	TO NIZ KHALOI GHUGRA ROAD	7.00	-	Open cut	
363	-	220 KV HT LINE	83+780.42	220 KV HT POWER LINE	0.00	-	Open cut	
364	-	BT ROAD	84+039.10	TO DISANPANI-RAJGARH ROAD	7.00	-	Open cut/ Zero HDD	
365	-	CART TRACK	84+158.09	TO LAI CHENG GAON ROAD	3.00	-	Open cut	
366	CS-55	DISANG RIVER	84+507.72	DISANG RIVER	90.00	120.00	HDD	
367	-	CART TRACK	84+941.17	TO NIZ KHALOI GHUGRA ROAD	12.00	-	Open cut	
368	-	CART TRACK	85+005.82	TO FIELD ROAD	21.00	-	Open cut	
369	CS-56	ONGC PIPELINE	85+783.69	ONGC PIPELINE	1.00	15.00	Open cut	
370	-	CART TRACK	86+180.65	TO FIELD ROAD	2.50	-	Open cut	
371	-	CART TRACK	86+244.59	TO FIELD ROAD	2.50	-	Open cut	
372	-	CART TRACK	86+552.05	TO BHELOGURI DUBI LAKWA CHAH B ROAD	2.00	-	Open cut	
373	-	NALA	86+566.94	NALA	2.50	-	Open cut	
374	-	NALA	86+620.49	NALA	3.00	-	Open cut	
375	-	NALA	87+110.61	NALA	6.00	-	Open cut	
376	-	BT ROAD	87+181.44	TO BHELOGURI DUBI LAKWA CHAH B ROAD	4.50	-	Open cut/ Zero HDD	
377		ONGC PIPELINE	87+213.43	ONGC PIPELINE	1.00		Open cut	
378		ONGC PIPELINE	87+221.66	ONGC PIPELINE	1.00		Open cut	

379	CS-57	ONGC PIPELINE	87+235.97	ONGC PIPELINE	1.00	25.00	Open cut	
380		ONGC PIPELINE	87+238.90	ONGC PIPELINE	1.00		Open cut	
381		ONGC PIPELINE	87+243.06	ONGC PIPELINE	1.00		Open cut	
382	CS-58	ONGC PIPELINE	87+675.45	ONGC PIPELINE	1.00	15.00	Open cut	
383	-	CART TRACK	87+677.49	TO FIELD ROAD	2.00	-	Open cut	
384	CS-59	MDR ROAD	87+944.69	TO BHELOGURI DUBI LAKWA CHAH B ROAD	10.00	16.00	Open cut	
385	-	BRICK ROAD	87+976.34	TO COLONY ROAD	2.50	-	Open cut	
386	CS-60	ONGC PIPELINE	88+005.46	ONGC PIPELINE	1.00	25.00	Open cut	
387	-	WBM ROAD	88+115.11	TO CHOLA CHAH BAGICHA ROAD	4.00	-	Open cut	
388	CS-61	ONGC PIPELINE	88+263.81	ONGC PIPELINE	1.00	30.00	Open cut	
389	-	NALA	88+266.53	NALA	9.50	-	Open cut	
390	CS-62	ONGC PIPELINE	88+272.86	ONGC PIPELINE	1.00	30.00	Open cut	
391	-	220 KV HT LINE	88+313.21	220 KV HT POWER LINE	0.00	-	Open cut	
392	-	BT ROAD	88+440.74	TO LAKWA RAJGARH ROAD	6.50	-	Open cut/ Zero HDD	
393	CS-63	ONGC PIPELINE	88+457.80	ONGC PIPELINE	1.00	15.00	Open cut	
394	-	NALA	88+516.11	NALA	4.50	-	Open cut	
395	-	WBM ROAD	88+579.35	TO FIELD ROAD	3.00	-	Open cut	
396	CS-64	ONGC PIPELINE	88+627.27	ONGC PIPELINE	1.00	25.00	Open cut	
397		ONGC PIPELINE	88+644.77	ONGC PIPELINE	1.00		Open cut	
398	-	BRICK ROAD	88+778.67	TO BHELOGURI DUBI LAKWA CHAH B ROAD	2.50	-	Open cut	
399	-	220KV HT LINE	88+844.36	220 KV HT POWER LINE	0.00	-	Open cut	
400	-	11 KV POWER LINE	89+112.91	11 KV POWER LINE	0.00	-	Open cut	
401	-	BT ROAD	89+114.54	TO CHOLA CHAH BAGICHA ROAD	4.00	-	Open cut/ Zero HDD	
402	-	220KV HT LINE	89+142.39	220 KV HT POWER LINE	0.00	-	Open cut	
403	-	220KV HT LINE	89+211.11	220 KV HT POWER LINE	0.00	-	Open cut	
404	CS-65	ONGC PIPELINE	89+352.86	ONGC PIPELINE	1.00	15.00	Open cut	
405	-	220KV HT LINE	89+471.60	220 KV HT POWER LINE	0.00	-	Open cut	
406	CS-66	ONGC PIPELINE	89+489.54	ONGC PIPELINE	1.00	15.00	Open cut	
407	-	WBM ROAD	89+494.99	TO BHAJONI ROAD	4.50	-	Open cut	
408	-	WBM ROAD	89+531.11	TO ONGC COLONY LAKWA ROAD	5.00	-	Open cut	
409	CS-67	MDR ROAD	89+534.14	TO ONGC COLONY LAKWA ROAD	8.00	18.00	Open cut	
410	-	POND	89+616.48	POND	12.00	-	Open cut	
411	-	11 KV POWER LINE	89+920.89	11 KV POWER LINE	0.00	-	Open cut	
412	-	BT ROAD	90+018.71	TO ONGC COLONY LAKWA ROAD	4.50	-	Open cut/ Zero HDD	
413	-	11 KV POWER LINE	90+019.54	11 KV POWER LINE	0.00	-	Open cut	
414	-	230V ELECTRIC POWER LINE	90+025.56	230V ELECTRIC POWER LINE	0.00	-	Open cut	
415	-	BT ROAD	90+788.03	TO DEODHAI ROAD	3.50	-	Open cut/ Zero HDD	
416	-	11 KV POWER LINE	91+683.76	11 KV POWER LINE	0.00	-	Open cut	
417	-	BT ROAD	92+018.25	TO LAKWA ROAD	4.50	-	Open cut/ Zero HDD	
418	-	11 KV POWER LINE	92+052.41	11 KV POWER LINE	0.00	-	Open cut	
419	-	POND	92+098.03	POND	22.00	-	Open cut/ HDD	
420	-	BT ROAD	93+594.74	TO DIHINGIA KONWAR ROAD	4.00	-	Open cut/ Zero HDD	
421	-	WBM ROAD	94+914.60	TO BORBORUA MOIDAM ROAD	2.00	-	Open cut	

422	-	POND	94+937.43	POND	22.50	-	Open cut/ HDD	
423	-	230V ELECTRIC POWER LINE	96+338.36	230V ELECTRIC POWER LINE	0.00	-	Open cut	
424	-	CART TRACK	96+348.03	TO BORBORUA MOIDAM ROAD	2.00	-	Open cut	
425	-	CART TRACK	96+376.01	TO BORBORUA MOIDAM ROAD	2.50	-	Open cut	
426	-	CART TRACK	96+853.53	TO POTHALIGARH MOIDAM ROAD	2.50	-	Open cut	
427	-	BT ROAD	97+261.82	TO JALUKANI BILL ROAD	5.50	-	Open cut/ Zero HDD	
428	CS-68	ONGC PIPELINE	98+085.22	ONGC PIPELINE	1.00	25.00	Open cut	
429		ONGC PIPELINE	98+094.37	ONGC PIPELINE	1.00		Open cut	
430		ONGC PIPELINE	98+097.69	ONGC PIPELINE	1.00		Open cut	
431	-	220KV HT LINE	98+103.00	220 KV HT POWER LINE	0.00	-	Open cut	
432	-	BRICK ROAD	98+215.65	TO GHORACHUWA ROAD	3.50	-	Open cut	
433	-	BT ROAD	98+386.26	TO JALUKANI BILL ROAD	3.00	-	Open cut/ Zero HDD	
434	-	BRICK ROAD	99+074.84	TO JALUKANI BILL ROAD	3.50	-	Open cut	
435	CS-69	ONGC PIPELINE	100+150.63	ONGC PIPELINE	1.00	25.00	Open cut	
436		ONGC PIPELINE	100+155.24	ONGC PIPELINE	1.00		Open cut	
437		ONGC PIPELINE	100+159.90	ONGC PIPELINE	1.00		Open cut	
438	-	BT ROAD	100+240.35	TO DHITAI PUKHURI BHAIGONI GAON ROAD	3.00	-	Open cut/ Zero HDD	
439	-	11 KV POWER LINE	100+435.82	11 KV POWER LINE	0.00	-	Open cut	
440	-	11 KV POWER LINE	100+552.72	11 KV POWER LINE	0.00	-	Open cut	
441	CS-70	ONGC PIPELINE	100+661.56	ONGC PIPELINE	1.00	25.00	Open cut	
442		ONGC PIPELINE	100+670.14	ONGC PIPELINE	1.00		Open cut	
443		ONGC PIPELINE	100+678.95	ONGC PIPELINE	1.00		Open cut	
444	-	11 KV POWER LINE	100+704.05	11 KV POWER LINE	0.00	-	Open cut	
445	CS-71	MDR ROAD	100+706.17	TO NO. KONWAR ROAD	4.00	12.00	Open cut	
446	CS-72	ONGC PIPELINE	100+861.47	ONGC PIPELINE	1.00	25.00	Open cut	
447		ONGC PIPELINE	100+867.18	ONGC PIPELINE	1.00		Open cut	
448		ONGC PIPELINE	100+872.98	ONGC PIPELINE	1.00		Open cut	
449	-	BT ROAD	100+898.89	TO NO. KONWAR ROAD	3.00	-	Open cut/ Zero HDD	
450	-	220KV HT LINE	100+967.39	220 KV HT POWER LINE	0.00	-	Open cut	
451	CS-73	DARIKA RIVER	102+693.44	DARIKA RIVER	24.00	40.00	HDD	
452	-	BT ROAD	103+227.18	TO NO. KONWAR ROAD	5.50	-	Open cut/ Zero HDD	
453	-	POND	103+265.50	POND	39.00	-	Open cut/ HDD	
454	-	POND	103+573.87	POND	30.50	-	Open cut/ HDD	
455	-	132 KV HT POWER LINE	104+208.56	132 KV HT POWER LINE	0.00	-	Open cut	
456	-	BT ROAD	104+537.28	TO LATUM ROAD	6.00	-	Open cut/ Zero HDD	
457	CS-74	MDR ROAD	105+056.40	TO LATUM ROAD	4.50	12.00	Open cut	
458	-	BRICK ROAD	106+125.62	TO LATUM ROAD	2.50	-	Open cut	
459	CS-75	RAILWAY LINE	106+530.78	RAILWAY LINE	1.68	16.00	HDD	
460	CS-76	NH-702C	106+813.06	TO JHATIPOTIA - BG ROAD (NH - 702C)	7.00	20.00	HDD	
461	CS-77	DIKHOW RIVER	107+533.88	DIKHOW RIVER	100.00	120.00	HDD	
462	-	CART TRACK	107+625.04	TO ACHALAPATHAR ROAD	2.50	-	Open cut	
463	CS-78	MDR ROAD	109+100.01	TO JOYSAGAR - NAZIRA ROAD	6.00	14.00	Open cut	
464	-	NALA	110+550.55	NALA	5.50	-	Open cut	

465	-	11 KV POWER LINE	110+679.95	11 KV POWER LINE	0.00	-	Open cut	
466	-	BRICK ROAD	110+684.42	TO MOLA GAON ROAD	4.50	-	Open cut	
467	-	CART TRACK	111+463.31	TO DIHINGIA ROAD	3.00	-	Open cut	
468	CS-79	ONGC PIPELINE	111+488.34	ONGC PIPELINE	1.00	25.00	Open cut	
469		ONGC PIPELINE	111+499.22	ONGC PIPELINE	1.00		Open cut	
470		ONGC PIPELINE	111+513.73	ONGC PIPELINE	1.00		Open cut	
471	-	CART TRACK	111+568.18	TO DIHINGIA ROAD	4.00	-	Open cut	
472	-	BT ROAD	112+134.83	TO MADURI GOHAIN ROAD	2.00	-	Open cut/ Zero HDD	
473	-	BT ROAD	112+299.40	TO BOR GOHAIN ROAD	3.00	-	Open cut/ Zero HDD	
474	CS-80	ONGC PIPELINE	112+482.76	ONGC PIPELINE	1.00	25.00	Open cut	
475		ONGC PIPELINE	112+493.76	ONGC PIPELINE	1.00		Open cut	
476		ONGC PIPELINE	112+501.95	ONGC PIPELINE	1.00		Open cut	
477	-	NALA	112+509.30	NALA	2.00	-	Open cut	
478	-	CART TRACK	112+855.65	TO MADURI GOHAIN ROAD	3.00	-	Open cut	
479	-	BT ROAD	112+863.40	TO MADURI GOHAIN ROAD	5.00	-	Open cut/ Zero HDD	
480	-	NALA	112+871.09	NALA	3.00	-	Open cut	
481	-	132 KV HT POWER LINE	112+892.21	132 KV HT POWER LINE	0.00	-	Open cut	
482	-	BT ROAD	113+540.31	TO MADURI CHAH BAGICHA ROAD	8.00	-	Open cut/ Zero HDD	
483	-	220KV HT LINE	113+902.10	220 KV HT POWER LINE	0.00	-	Open cut	
484	-	66 KV HT POWER LINE	114+155.34	66 KV HT POWER LINE	0.00	-	Open cut	
485	-	11 KV POWER LINE	114+173.05	11 KV POWER LINE	0.00	-	Open cut	
486	-	CART TRACK	114+661.87	TO BOR GOHAIN ROAD	9.00	-	Open cut	
487	-	CART TRACK	114+784.80	TO BOR GOHAIN ROAD	3.00	-	Open cut	
488	-	NALA	114+818.98	NALA	7.00	-	Open cut	
489	-	CART TRACK	114+838.72	TO DHODAR ALI ROAD	3.00	-	Open cut	
490	-	132 KV HT POWER LINE	114+990.56	132 KV HT POWER LINE	0.00	-	Open cut	
491	-	CART TRACK	115+126.44	TO DHODAR ALI ROAD	3.50	-	Open cut	
492	-	11 KV POWER LINE	115+202.94	11 KV POWER LINE	0.00	-	Open cut	
493	-	WBM ROAD	115+355.01	TO GARHGAON ROAD	5.00	-	Open cut	
494	-	11 KV POWER LINE	115+356.94	11 KV POWER LINE	0.00	-	Open cut	
495	CS-81	SH-1	115+841.64	TO REBOTI BAHGORAH GAON - DHODAR ALI	7.00	16.00	HDD	
496	-	11 KV POWER LINE	115+845.60	11 KV POWER LINE	0.00	-	Open cut	
497	CS-82	RAILWAY LINE	115+904.80	RAILWAY LINE	1.68	16.00	HDD	
498	-	BT ROAD	115+934.48	TO MEZENGA ROAD	5.00	-	Open cut/ Zero HDD	
499	-	BT ROAD	116+686.74	TO MEZENGA ROAD	4.50	-	Open cut/ Zero HDD	
500	-	POND	117+470.90	POND	17.00	-	Open cut	
501	-	CART TRACK	117+690.30	TO COLONY ROAD	2.00	-	Open cut	
502	-	CART TRACK	117+783.89	TO HATSOI GRANT -II ROAD	4.50	-	Open cut	
503	-	BT ROAD	118+177.36	TO NAZIRA ROAD	4.00	-	Open cut/ Zero HDD	
504	-	WBM ROAD	118+332.74	TO NAZIRA ROAD	3.50	-	Open cut	
505	-	NALA	118+454.84	NALA	8.50	-	Open cut	
506	-	BT ROAD	118+512.05	TO HATSOI GRANT -II ROAD	12.50	-	Open cut/ Zero HDD	
507	-	WBM ROAD	118+588.23	TO FIELD ROAD	2.00	-	Open cut	

508	-	CART TRACK	118+978.41	TO HATSOI GRANT -II ROAD	3.00	-	Open cut	
509	-	BT ROAD	119+214.64	TO LIGRIPUKHURI ROAD	18.00	-	Open cut/ Zero HDD	
510	-	230V ELECTRIC POWER LINE	119+930.97	230V ELECTRIC POWER LINE	0.00	-	Open cut	
511	-	230V ELECTRIC POWER LINE	119+932.18	230V ELECTRIC POWER LINE	0.00	-	Open cut	
512	-	WBM ROAD	119+935.37	TO DEOGHARIA DUWARAH ROAD	5.50	-	Open cut	
513	-	11 KV POWER LINE	119+936.64	11 KV POWER LINE	0.00	-	Open cut	
514	-	11 KV POWER LINE	119+937.83	11 KV POWER LINE	0.00	-	Open cut	
515	-	POND	120+040.82	POND	22.00	-	Open cut/ HDD	
516	-	WBM ROAD	120+207.80	TO DEOGHARIA DUWARAH ROAD	2.00	-	Open cut	
517	-	NALA	120+370.38	NALA	4.50	-	Open cut	
518	-	230V ELECTRIC POWER LINE	120+602.43	230V ELECTRIC POWER LINE	0.00	-	Open cut	
519	-	230V ELECTRIC POWER LINE	120+603.91	230V ELECTRIC POWER LINE	0.00	-	Open cut	
520	-	CART TRACK	120+608.87	TO DEOGHARIA DUWARAH ROAD	3.00	-	Open cut	
521	-	NALA	120+609.48	NALA	6.00	-	Open cut	
522	-	WBM ROAD	120+852.81	TO DEOGHARIA DUWARAH ROAD	4.50	-	Open cut	
523	CS-83	NAMDANG RIVER	120+894.03	NAMDANG RIVER	23.00	50.00	HDD	
524	-	230V ELECTRIC POWER LINE	121+359.31	230V ELECTRIC POWER LINE	0.00	-	Open cut	
525	-	CART TRACK	121+395.50	TO DEOGHARIA GAON ROAD	8.50	-	Open cut	
526	-	230V ELECTRIC POWER LINE	121+415.18	230V ELECTRIC POWER LINE	0.00	-	Open cut	
527	-	BRICK ROAD	122+205.60	TO DOLAKAKHORIA BAM ROAD	4.00	-	Open cut	
528	-	230V ELECTRIC POWER LINE	122+207.93	230V ELECTRIC POWER LINE	0.00	-	Open cut	
529	CS-84	ONGC PIPELINE	123+065.32	ONGC PIPELINE	1.00	25.00	Open cut	
530		ONGC PIPELINE	123+071.01	ONGC PIPELINE	1.00		Open cut	
531		ONGC PIPELINE	123+078.60	ONGC PIPELINE	1.00		Open cut	
532	-	220KV HT LINE	123+226.53	220 KV HT POWER LINE	0.00	-	Open cut	
533	-	230V ELECTRIC POWER LINE	123+245.50	230V ELECTRIC POWER LINE	0.00	-	Open cut	
534	CS-85	MDR ROAD	123+248.75	TO DOLAKAKHORIA BAM ROAD	5.00	12.00	Open cut	
535	-	CART TRACK	123+531.41	TO FIELD ROAD	2.00	-	Open cut	
536	-	NALA	123+728.83	NALA	10.00	-	Open cut	
537	-	CART TRACK	124+323.33	TO FIELD ROAD	2.00	-	Open cut	
538	-	NALA	124+671.29	NALA	4.50	-	Open cut	
539	CS-86	ONGC PIPELINE	125+201.34	ONGC PIPELINE	1.00	15.00	Open cut	
540	-	BT ROAD	125+394.73	TO BPCL PLANT ROAD	6.00	-	Open cut/ Zero HDD	
541	-	CART TRACK	126+479.91	TO FIELD ROAD	3.50	-	Open cut	
542	-	BT ROAD	127+262.08	TO NA- PAM BARUOTI ROAD	4.50	-	Open cut/ Zero HDD	
543	-	11 KV POWER LINE	127+632.30	11 KV POWER LINE	0.00	-	Open cut	
544	-	BT ROAD	127+658.69	TO DEOPANI GOHAIN ROAD	3.50	-	Open cut/ Zero HDD	
545	-	230V ELECTRIC POWER LINE	127+668.47	230V ELECTRIC POWER LINE	0.00	-	Open cut	
546	CS-87	ONGC PIPELINE	127+727.50	ONGC PIPELINE	1.00	15.00	Open cut	
547	-	CART TRACK	127+789.10	TO DEOPANI GOHAIN ROAD	3.50	-	Open cut	
548	CS-88	ONGC PIPELINE	127+792.39	ONGC PIPELINE	1.00	15.00	Open cut	
549	CS-89	ONGC PIPELINE	128+052.82	ONGC PIPELINE	1.00	15.00	Open cut	
550	CS-90	ONGC PIPELINE	128+084.25	ONGC PIPELINE	1.00	15.00	Open cut	

551	-	CART TRACK	128+111.55	TO DEOPANI BAGISHA ROAD	3.00	-	Open cut	
552	CS-91	ONGC PIPELINE	128+114.81	ONGC PIPELINE	1.00	15.00	Open cut	
553	-	NALA	128+200.85	NALA	16.00	-	Open cut	
554	CS-92	ONGC PIPELINE	128+273.65	ONGC PIPELINE	1.00	15.00	Open cut	
555	CS-93	ONGC PIPELINE	128+588.06	ONGC PIPELINE	1.00	15.00	Open cut	
556		ONGC PIPELINE	128+590.39	ONGC PIPELINE	1.00		Open cut	
557	CS-94	MDR ROAD	128+659.08	TO JOYSAGAR-NAMTI-DEOPANI ROAD	3.50	12.00	Open cut	
558	-	11 KV POWER LINE	128+660.39	11 KV POWER LINE	0.00	-	Open cut	
559	CS-95	ONGC PIPELINE	128+850.37	ONGC PIPELINE	1.00	15.00	Open cut	
560		ONGC PIPELINE	128+850.57	ONGC PIPELINE	1.00		Open cut	
561	-	NALA	129+455.74	NALA	2.50	-	Open cut	
562	-	BRICK ROAD	129+459.13	TO LUNPURIA ROAD	3.50	-	Open cut	
563	-	11 KV POWER LINE	129+466.21	11 KV POWER LINE	0.00	-	Open cut	
564	-	230V ELECTRIC POWER LINE	129+466.39	230V ELECTRIC POWER LINE	0.00	-	Open cut	
565	-	NALA	129+658.08	NALA	2.00	-	Open cut	
566	-	NALA	130+104.47	NALA	5.00	-	Open cut	
567	-	CART TRACK	130+182.32	TO COLONY ROAD	2.50	-	Open cut	
568	-	BT ROAD	130+644.14	TO BOSHILLAH DULIA ROAD	4.50	-	Open cut/ Zero HDD	
569	-	11 KV POWER LINE	130+653.53	11 KV POWER LINE	0.00	-	Open cut	
570	-	220KV HT LINE	131+303.93	220 KV HT POWER LINE	0.00	-	Open cut	
571	-	WBM ROAD	131+366.41	TO BOLIMARA KARCHUA ROAD	3.00	-	Open cut	
572	-	BRICK ROAD	131+728.01	TO MICHAJAN KK ROAD	2.00	-	Open cut	
573	-	230V ELECTRIC POWER LINE	131+735.38	230V ELECTRIC POWER LINE	0.00	-	Open cut	
574	-	BT ROAD	132+497.13	TO BOSHILLAH - BASTI DUM GAON ROAD	3.00	-	Open cut/ Zero HDD	
575	-	11 KV POWER LINE	132+541.30	11 KV POWER LINE	0.00	-	Open cut	
576	CS-96	MDR ROAD	133+246.37	TO BOLIMARA KARCHUA ROAD	3.00	16.00	Open cut	
577	-	230V ELECTRIC POWER LINE	133+247.64	230V ELECTRIC POWER LINE	0.00	-	Open cut	
578	-	11 KV POWER LINE	133+256.11	11 KV POWER LINE	0.00	-	Open cut	
579	-	NALA	133+425.78	NALA	5.50	-	Open cut	
580	-	BT ROAD	133+442.84	TO BOLIMARA KARCHUA ROAD	11.00	-	Open cut/ Zero HDD	
581	-	WBM ROAD	133+494.01	TO SENCHOA ROAD	5.00	-	Open cut	
582	-	POND	133+718.53	POND	12.00	-	Open cut	
583	-	POND	134+213.90	POND	13.00	-	Open cut	
584	CS-97	MDR ROAD	134+245.02	TO SENCHOA ROAD	5.00	12.00	Open cut	
585	-	WBM ROAD	134+459.38	TO GHARPHALIA ROAD	5.00	-	Open cut	
586	-	NALA	134+985.18	NALA	12.00	-	Open cut	
587	-	NALA	135+363.43	NALA	4.00	-	Open cut	
588	-	NALA	136+458.70	NALA	7.50	-	Open cut	
589	-	CC ROAD	137+345.71	TO VILLAGE ROAD	3.00	-	HDD	
590	-	BT ROAD	137+626.06	TO VILLAGE ROAD	4.50	-	Open cut/ Zero HDD	
591	-	BT ROAD	137+930.00	TO MEHGARH ALI ROAD	4.00	-	Open cut/ Zero HDD	
592	-	WBM ROAD	138+163.93	TO FIELD ROAD	2.50	-	Open cut	
593	-	CC ROAD	138+609.70	TO VILLAGE ROAD	3.00	-	HDD	

594	-	WBM ROAD	139+018.80	TO VILLAGE ROAD	4.00	-	Open cut	
595	-	WBM ROAD	139+312.39	TO VILLAGE ROAD	2.00	-	Open cut	
596	-	CART TRACK	139+990.34	TO FIELD ROAD	2.50	-	Open cut	
597	-	BT ROAD	140+664.60	WAY TO SH-1 ROAD	3.00	-	Open cut/ Zero HDD	
598	-	CART TRACK	140+884.37	TO AMGURI ROAD	3.00	-	Open cut	
599	-	11 KV POWER LINE	141+368.30	11 KV POWER LINE	0.00	-	Open cut	
600	CS-98	RAILWAY LINE	141+391.15	RAILWAY LINE	1.68	18.00	HDD	
601	CS-99	SH-1	141+715.34	TO AMGURI - DHODAR ALI ROAD (SH-1)	7.00	16.00	HDD	
602	-	11 KV POWER LINE	141+719.37	11 KV POWER LINE	0.00	-	Open cut	
603	-	132 KV HT POWER LINE	141+848.65	132 KV HT POWER LINE	0.00	-	Open cut	
604	-	WBM ROAD	142+114.26	TO KHANKIKAR ROAD	3.00	-	Open cut	
605	-	NALA	142+391.51	NALA	7.50	-	Open cut	
606	-	11 KV POWER LINE	142+588.77	11 KV POWER LINE	0.00	-	Open cut	
607	-	220KV HT LINE	142+589.51	220 KV HT POWER LINE	0.00	-	Open cut	
608	-	BT ROAD	142+591.56	TO DHUNIA GAON ROAD	4.50	-	Open cut/ Zero HDD	
609	-	BT ROAD	144+133.43	TO SUNUWAL ROAD	4.00	-	Open cut/ Zero HDD	
610	-	230V ELECTRIC POWER LINE	144+134.12	230V ELECTRIC POWER LINE	0.00	-	Open cut	
611	-	BT ROAD	144+492.91	TO SUNUWAL ROAD	4.50	-	Open cut/ Zero HDD	
612	-	66 KV HT POWER LINE	144+754.93	66 KV HT POWER LINE	0.00	-	Open cut	
613	-	WBM ROAD	144+885.87	TO SUNUWAL ROAD	2.00	-	Open cut	
614	-	11 KV POWER LINE	145+079.24	11 KV POWER LINE	0.00	-	Open cut	
615	CS-100	NH-2	145+222.38	TO JHANJI - AMGURI ROAD (NH -2)	7.00	20.00	HDD	
616	-	11 KV POWER LINE	145+347.42	11 KV POWER LINE	0.00	-	Open cut	
617	-	NALA	145+566.42	NALA	5.50	-	Open cut	
618	-	BT ROAD	146+235.22	TO LEPHERA CHAWDANG	5.00	-	Open cut/ Zero HDD	
619	-	BT ROAD	146+453.21	TO LEPHERA CHAWDANG	3.50	-	Open cut/ Zero HDD	
620	-	230V ELECTRIC POWER LINE	146+455.60	230V ELECTRIC POWER LINE	0.00	-	Open cut	
621	-	132 KV HT POWER LINE	146+493.56	132 KV HT POWER LINE	0.00	-	Open cut	
622	CS-101	JANJI RIVER	146+993.39	JANJI RIVER	50.00	65.00	HDD	
623	CS-102	MDR ROAD	147+537.69	TO LCR ROAD	3.00	12.00	Open cut	
624	-	230V ELECTRIC POWER LINE	147+538.21	230V ELECTRIC POWER LINE	0.00	-	Open cut	
625	-	CART TRACK	148+099.47	TO SURAMONI GAON ROAD	2.00	-	Open cut	
626	-	132 KV HT POWER LINE	148+182.12	132 KV HT POWER LINE	0.00	-	Open cut	
627	-	WBM ROAD	149+058.46	TO ASSAM TRUNK ROAD	3.50	-	Open cut	
628	-	WBM ROAD	149+473.28	TO FIELD ROAD	5.00	-	Open cut	
629	-	CART TRACK	149+526.87	TO FIELD ROAD	3.00	-	Open cut	
630	CS-103	OIL INDIA	149+529.03	OIL INDIA LTD PIPELINE	1.00	20.00	Open cut	
631		DNPL PIPELINE	149+534.03	DNPL PIPELINE	1.00		Open cut	
632	-	BRICK ROAD	150+324.39	TO FIELD ROAD	3.50	-	Open cut	
633	-	NALA	151+066.25	NALA	6.00	-	Open cut	
634	CS-104	OIL INDIA	151+143.40	OIL INDIA LTD PIPELINE	1.00	20.00	Open cut	
635		DNPL PIPELINE	151+148.40	DNPL PIPELINE	1.00		Open cut	
636	-	CART TRACK	151+151.29	TO FIELD ROAD	4.00	-	Open cut	

637	-	CART TRACK	151+202.58	TO FIELD ROAD	7.00	-	Open cut	
638	-	CART TRACK	151+611.13	TO FIELD ROAD	4.00	-	Open cut	
639	-	132 KV HT POWER LINE	152+106.23	132 KV HT POWER LINE	0.00	-	Open cut	
640	CS-105	MDR ROAD	152+282.05	TO CHANGMAI GAON ROAD	5.00	14.00	Open cut	
641	CS-106	NALA	153+321.14	NALA	12.00	15.00	Open cut	
642	CS-107	ONGC PIPELINE	153+828.53	ONGC PIPELINE	1.00	15.00	Open cut	
643	CS-108	MDR ROAD	154+621.24	TO DIHINGIA KALITA GAON ROAD	4.50	12.00	Open cut	
644	CS-109	ONGC PIPELINE	155+497.85	ONGC PIPELINE	1.00	15.00	Open cut	
645	-	CC ROAD	155+585.66	TO TEOK GRANT ROAD	3.00	-	HDD	
646	-	CART TRACK	156+209.84	TO FIELD ROAD	2.00	-	Open cut	
647	-	NALA	156+398.97	NALA	12.00	-	Open cut	
648	-	BRICK ROAD	156+510.45	TO ASSAM TRUNK (NH715) ROAD	3.50	-	Open cut	
649	-	BRICK ROAD	157+162.99	TO NOWBAISA GAON ROAD	3.00	-	Open cut	
650	-	NALA	157+824.30	NALA	2.50	-	Open cut	
651	-	BT ROAD	157+999.57	TO NOWBAISA GAON ROAD	3.50	-	Open cut/ Zero HDD	
652	-	BT ROAD	158+152.98	TO FIELD ROAD	4.00	-	Open cut/ Zero HDD	
653	-	11 KV POWER LINE	158+415.39	11 KV POWER LINE	0.00	-	Open cut	
654	-	NALA	158+586.26	NALA	8.00	-	Open cut	
655	-	11 KV POWER LINE	159+095.92	11 KV POWER LINE	0.00	-	Open cut	
656	-	BT ROAD	159+100.43	TO SONARI GAON BARMEDHI CHUK ROAD	4.00	-	Open cut/ Zero HDD	
657	-	11 KV POWER LINE	159+691.27	11 KV POWER LINE	0.00	-	Open cut	
658	-	11 KV POWER LINE	160+008.47	11 KV POWER LINE	0.00	-	Open cut	
659	-	BT ROAD	160+123.73	TO BHARALOWA SONARI ROAD	3.50	-	Open cut/ Zero HDD	
660	-	11 KV POWER LINE	160+304.16	11 KV POWER LINE	0.00	-	Open cut	
661	-	BT ROAD	160+591.72	TO BADULIPUKHURI MAJA GAON ROAD	4.50	-	Open cut/ Zero HDD	
662	-	11 KV POWER LINE	161+313.99	11 KV POWER LINE	0.00	-	Open cut	
663	-	CART TRACK	161+329.53	TO FIELD ROAD	3.00	-	Open cut	
664	-	11 KV POWER LINE	161+548.06	11 KV POWER LINE	0.00	-	Open cut	
665	-	11 KV POWER LINE	162+031.14	11 KV POWER LINE	0.00	-	Open cut	
666	-	BT ROAD	162+034.01	TO NORA GAON ROAD	4.00	-	Open cut/ Zero HDD	
667	-	BRICK ROAD	162+194.39	TO NORA GAON ROAD	3.00	-	Open cut	
668	CS-110	OIL INDIA	162+436.65	OIL INDIA LTD PIPELINE	1.00	15.00	Open cut	
669		ONGC PIPELINE (DC)	162+441.65	ONGC PIPELINE (DC)			Open cut	
670		DNPL PIPELINE	162+446.65	DNPL PIPELINE			Open cut	
671	-	11 KV POWER LINE	162+712.30	11 KV POWER LINE	0.00	-	Open cut	
672	CS-111	NH-715	162+744.94	TO ASSAM TRUNK (NH-715) ROAD	24.00	60.00	HDD	
673	-	11 KV POWER LINE	162+769.35	11 KV POWER LINE	0.00	-	Open cut	
674	-	NALA	163+441.84	NALA	11.50	-	Open cut	
675	-	BRICK ROAD	164+907.54	TO DULIAGAON ROAD	3.00	-	Open cut	
676	-	NALA	166+004.98	NALA	15.00	-	Open cut	
677	-	CART TRACK	166+528.89	TO KHATA PATHAR ROAD	3.50	-	Open cut	
678	-	CART TRACK	167+349.31	TO FIELD ROAD	6.00	-	Open cut	
679	-	NALA	167+517.43	NALA	5.50	-	Open cut	

680	-	NALA	167+866.06	NALA	10.50	-	Open cut	
681	CS-112	IGGL PIPELINE	168+409.86	IGGL PIPELINE	1.00	20.00	Open cut	
682	-	33 KV POWER LINE	169+230.01	33 KV POWER LINE	0.00	-	Open cut	
683	-	CART TRACK	169+240.14	TO FIELD ROAD	3.00	-	Open cut	
684	-	CART TRACK	169+678.96	TO FIELD ROAD	5.50	-	Open cut	
685	-	CART TRACK	169+971.45	TO FIELD ROAD	5.50	-	Open cut	
686	-	POND	170+374.80	POND	19.00	-	Open cut	
687	-	CART TRACK	170+452.48	TO FIELD ROAD	5.50	-	Open cut	
688	-	CART TRACK	171+432.60	TO FIELD ROAD	4.50	-	Open cut	
689	-	CART TRACK	172+161.62	TO FIELD ROAD	6.00	-	Open cut	
690	-	NALA	172+834.48	NALA	3.00	-	Open cut	
691	-	11 KV POWER LINE	172+838.66	11 KV POWER LINE	0.00	-	Open cut	
692	-	BRICK ROAD	172+842.86	TO NEMATI CHAPORI ROAD	4.50	-	Open cut	
693	-	11 KV POWER LINE	173+473.29	11 KV POWER LINE	0.00	-	Open cut	
694	-	CART TRACK	173+473.95	TO FIELD ROAD	2.00	-	Open cut	
695	-	CART TRACK	173+475.69	TO FIELD ROAD	4.00	-	Open cut	
696	-	CART TRACK	173+917.08	TO FIELD ROAD	4.00	-	Open cut	
697	-	11 KV POWER LINE	174+081.02	11 KV POWER LINE	0.00	-	Open cut	
698	-	CART TRACK	174+251.34	TO FIELD ROAD	2.00	-	Open cut	
699	-	11 KV POWER LINE	174+542.03	11 KV POWER LINE	0.00	-	Open cut	
700	CS-113	NH-715K	174+546.86	TO NIMATI GHAT ROAD	7.00	20.00	HDD	
701	-	11 KV POWER LINE	174+551.19	11 KV POWER LINE	0.00	-	Open cut	
702	-	11 KV POWER LINE	174+882.73	11 KV POWER LINE	0.00	-	Open cut	
703	-	BRICK ROAD	174+888.35	TO GOHAINGAON ROAD	3.00	-	Open cut	
704	-	11 KV POWER LINE	174+889.10	11 KV POWER LINE	0.00	-	Open cut	

INDRADHANUSH GAS GRID LIMITED

DETAILED ENGINEERING SURVEY FOR DULIAJAN TO JORAHAT PIPELINE CONNECTIVITY

LIST OF ALL CROSSINGS COORDINATES FALLING ON THE ROUTE OF THE PIPELINE

Sl No	Easting	Northing	Type of Crossing	Chainage (Km)	Proposed Crossing Methodology
1	692375.9	3027837	11 KV POWER LINE	16.056	Open cut
2	691854.3	3027954	NALA	551.721	HDD
3	691785.1	3027972	NALA	623.09	HDD
4	691194.2	3028101	BT ROAD	1232.763	Open cut/ Zero HDD
5	690323.8	3028387	BRICK ROAD	2195.716	Open cut
6	689578.9	3028070	NALA	3016.354	HDD
7	689535.4	3028043	BRICK ROAD	3068.193	Open cut
8	689286.8	3028033	CART TRACK	3321.089	Open cut
9	689210.2	3028099	CART TRACK	3423.192	Open cut
10	688954.8	3028607	BT ROAD	4052.79	Open cut/ Zero HDD
11	688937.1	3028760	BRICK ROAD	4206.745	Open cut
12	688935.2	3028766	11 KV POWER LINE	4213.22	Open cut
13	688665.4	3028932	BRICK ROAD	4558.461	Open cut
14	688253	3028998	NALA	4976.583	HDD

19.0 LIST OF PARTIES FOR BOUGHT OUT ITEMS

(Appendix-IX to Particular Job Specification of Work)

Appendix-IX
To Particular Job Specification of Work

LIST OF SUPPLIERS OF MAJOR BOUGHT-OUT ITEMS

A) **Mainline & Mechanical**

i) PIPE CARBON STEEL TO INDIAN STANDARDS

1. A.S.T. PIPES PVT. LTD. (AST GROUP)
2. ADVANCE STEEL TUBE LTD.
3. APL APOLLO TUBES LTD. (ER. BIHAR TUBES LTD.
4. ASIAN MILLS PVT. LTD.
5. ASRANI TUBES LIMITED
6. DADU PIPES (P) LTD.
7. ESSAR STEEL LIMITED (ER HAZIRA PIPES MILL)
8. GAURANG PRODUCTS PVT LTD. (AST GROUP)
9. GOODLUCK STEEL TUBES LTD.
10. HI-TECH PIPES LIMITED
11. INDUS TUBE LIMITED
12. JINDAL INDUSTRIES LTD
13. JINDAL PIPES LTD.
14. JINDAL SAW LTD (KOSI WORKS)
15. JOTINDRA STEEL & TUBE LTD
16. LALIT PIPES AND PIPES LTD.
17. MAHARASHTRA SEAMLESS LTD.
18. MAN INDUSTRIES (INDIA) LTD. – PITHAMPUR
19. MAN INDUSTRIES (INDIA) LTD. ANJAR
20. MUKAT TANKS & VESSELS LTD.
21. NEZONE TUBES LIMITED
22. NORTH EASTERN TUBES LIMITED
23. PRATIBHA INDUSTRIES LIMITED
24. PRATIBHA PIPES & STRUCTURAL LTD.
25. PSL LTD (CHENNAI)
26. PSL LTD (V1, V2 & NC)
27. RAMA STEEL TUBES LTD.
28. RATNAMANI METALS AND TUBES LTD.
29. RAVINDRA TUBES LIMITED
30. SAMSHI PIPE INDUSTRIES LIMITED
31. SURYA ROSHNI LTD.
32. SWASTIK PIPES LTD.
33. UTKARSH TUBES & PIPES LTD. (FORMLY BMW)
34. WELSPUN CORP. LIMITED (DAHEJ)
35. ZENITH BIRLA (INDIA) LIMITED

ii) PIPE & TUBULARS TO A.P.I. STANDARDS

1. ARCELORMITTAL TUBULAR PRODUCTS ROMAN SA,ROMANIA
2. BHEL (TRICHY),INDIA
3. DALMINE SPA (ENQUIRY TO TENARIS),UAE
4. EEWKOREA CO. LTD (GERMANY), KOREA
5. EEW KOREA CO. LTD. (KOREA), KOREA
6. EISENBAU KRAMER GMBH, GERMANY
7. HYUNDAI RB CO. LTD. SOUTH KOREA
8. ILVA LAMIERE E TUBI SRL (ENQ TO ILVA SPA, ITALY
9. INOX TECH. SPA, ITALY
10. ISMT LTD. AHMEDNGR, INDIA
11. ISMT LTD. BARAMATI, INDIA
12. JINDAL PIPES LTD., INDIA

13. JINDAL SAW LTD. (KOSI WORKS), INDIA
14. JINDAL SAW LTD. (NASHIK WORKS), INDIA
15. LALIT PIPES AND PIPES LTD. INDIA
16. MAHARASHTRA SEAMLESS LTD., INDIA
17. MAN INDUSTRIES (I) LTD. (PITHAMPUR), INDIA
18. MUKAT TANKS & VESSELS LTD., INDIA
19. PRATIBHA INDUSTRIES LIMITED, INDIA
20. RATNAMANI METALS AND TUBES LTD., INDIA
21. SIDERCA S.A.I.C (ENQUIRY TOTENARIS), UAE
22. SUMITOMO METAL IND. LTD., INDIA
23. SURYA ROSHNI LTD., INDIA
24. SWASTIK PIPES LTD, INDIA
25. TATA STEEL UK LIMITED (FORMERLY C702)
26. TUBOS DE ACERO DE MEXICO SA (ENQ. TENARIS), UAE
27. TUBOS REUNIDOS SA SPAIN
28. UMRAN STEEL PIPE INC (TURKEY), TURKEY
29. VALCOVNY TRUB CHOMUTOV, CZECH REPUBLIC
30. VALLOUREC AND MANNESMANN TUBES, FRANCE
31. WELSPUN CORP LIMITED (DAHEJ), INDIA

iii) <u>PIPE/TUBE CS (SEAMLESS) TO ASTM STDS</u>

1. ARCELORMITTAL TUBULAR PRODUCTS ROMAN SA, ROMANIA
2. BHEL (TRICHY), INDIA
3. CHANGSHU SEAMLESS STEEL TUBE CO. LTD., CHINA
4. DALMINE SPA (ENQUIRY TO TENARIS, UAE
5. HEAVY METALS & TUBES LIMITED (MEHSANA), INDIA
6. ISMT LTD. AHMEDNGR, INDIA
7. ISMT LTD. BARAMATI INDIA
8. JFE STEEL CORPORATION, UAE
9. JINDAL SDAW LTD (NASHIK WORKS) INDIA
10. KLT AUTOMOTIVE AND TUBULAR PRODUCTS LTD., INDIA
11. MAHALAXMI SEAMLESS LIMITED, INDIA
12. MAHARASHTRA SEAMLESS LTD, INDIA
13. PRODUCTS TUBULARES S.A.U, SPAIN
14. RATNADEEP METAL TUBES LTD., INDIA
15. STAINEEST TUBES PVT LTD., INDIA
16. SUMITOMO METAL IND. LTD., INDIA
17. TUBOS REUNIDOS SA SPAIN
18. VALCOVNY TRUB CHOMUTOV, CZECH REPUBLIC
19. VALLOUREC ANDMANNESMANN TUBES FRANCE
20. YANGZHOU CHENGDE STEEL PIPE CO. LTD DUBAI (UAE)

iv) <u>PIPE CARBON STEEL (WELDED) TO ASTM STDS</u>

1. EEW KOREA CO. LTD. (GERMANY), KOREA
2. EEW KOREA CO. LTD. (KOREA), KOREA
3. EISENBAU KRAMER GMBH, GERMANY
4. HYUNDAI RB CO. LTD., SOUTH KOREA
5. INOX TECH. SPA, ITALY
6. JINDAL SAW LTD (KOSI WORKS), INDIA
7. LALIT PIPES AND PIPES LTD., INDIA
8. MAN INDUSTERIES (I) LTD.(PITHAMPUR), INDIA
9. MAN INDUSTRIES (INDIA) LTD. ANJAR, INDIA
10. MUKAT TANKS & VESSELS LTD., INDIA
11. RATNAMANI METALS AND TUBES LTD., INDIA
12. SUMITOMO METAL INDIA LTD., INDIA
13. TATA STEEL UK LIMITED

v) <u>Valve</u>

a) **Globe Valves**

1) M/s BDK (New Delhi)
2) M/s DatreCorpn (Calcutta)
3) M/s KSB Pumps (New Delhi)
4) M/s L&T (New Delhi)
5) M/s Neco Schuber & Salzer Ltd. (New Delhi)
6) M/s Niton Valve (Mumbai)
7) M/s Ornate Valves (Mumbai)
8) M/s Panchavati Valves (Mumbai)
9) AV Valves Ltd.
10) BHEL (Trichy), India
11) Econo Valves Pvt Ltd, India
12) FouressEngg (I) Ltd (Aurangabad)
13) Guru Industrial Valves Pvt Ltd
14) Leader Valves Ltd, India
15) NSSL Ltd. (Neco Schubert &SalzerLtd)
16) Oswal Industries Ltd, India
17) Petrochemical Engineering Enterprises, India
18) Sakhi Engineers Pvt Ltd
19) Shalimar Valves Pvt Ltd
20) Steel Strong Valves India Pvt Ltd, India
21) Petro Valves Pvt. Limited, Ahmedabad

b) **Check Valves**

1. M/s Advance Valves Pvt. Ltd., Noida
2. M/s Aksons& Mechanical Enterprises, Mumbai
3. M/s Larsen & Toubro Limited (M/s Audco India Limited, Chennai)
4. M/s AV valves Ltd., Agra
5. M/s BDK engineering India Ltd., Hubli
6. M/s BHEL,OFE&OE Group, New Delhi
7. M/s DatreCoroportion Limited, Calcutta
8. M/s Leader Valves Ltd., Jalandhar
9. M/s Necoschubert & Salzer Ltd., New Delhi
10. M/s Niton Valves Industries (P) Ltd., Mumbai
11. M/s Precision Engg.Co., Mumbai
12. Econo Valves Pvt Ltd, India
13. FouressEngg (I) Ltd (Aurangabad)
14. KSB Pumps Ltd (Coimbattore), India
15. NSSL Ltd. (Neco Schubert &SalzerLtd)
16. Oswal Industries Ltd, India
17. Panchvati Valves &FlangesPvt Ltd, India
18. Petrochemical Engineering Enterprises, India
19. Sakhi Engineers Pvt Ltd
20. Shalimar Valves Pvt Ltd
21. Steel Strong Valves India Pvt Ltd, India

c) **Plug Valves**

1. M/s BredaEnergia Sesto Industria Spa, Italy
2. M/s Fisher Sanmar Ltd., Chennai
3. M/s Larsen & Toubro Ltd., New Delhi
4. M/s Nordstrom Valves, USA
5. M/s Serck Audco Valves, UK
6. M/s Sumitomo Corporation India Pvt. Ltd., New Delhi

7. M/s Z Corporation, Korea
8. M/s Hawa Valves (India) Pvt. Ltd., Mumbai
9. M/s Steel Strong Valves India Pvt. Ltd., Navi Mumbai
10. M/s Econo Valves
11. M/s Flow-Serve PTE (Mfr. SERCK), India

d) **Ball Valves**

1. M/s Hawa Valves (India) Pvt. Ltd, Navi Mumbai
2. M/s Larsen & Toubro, Delhi
3. M/s Microfinish Valves Pvt. Ltd., Noida
4. M/s Oswal Industries Ltd., Gandhi nagar
5. M/s Virgo Engineers Ltd., Delhi
6. M/s Boteli Valve Group Co. Ltd., China
7. M/s Cameron (Malaysia) SDN BHD, Malaysia
8. M/s Dafram S.P.A., Italy
9. M/s Fangyuan Valve Group Co. Ltd., China
10. M/s Franz Schuck GmbH, Germany

vi) <u>Flow Tee</u>

1) M/s Coprosider SPA, Italy
2) M/s GEA Energy System India Limited, Chennai
3) M/s MultitexFilteration
4) M/s Pipeline Engineering, UK
5) M/s ScomarkEngg. Limited (U.K.)
6) M/s Skeltonhall Limited, Engaland(U.K.)
7) M/s Technospecial SPA, Italy
8) M/s Tectubi SPA, Italy
9) M/s RMA Germany
10) M/s Pipefit Engineers Pvt. Ltd.

vii) <u>Split Tee</u>

1) M/s Ipsco, Canda
2) M/s TD Willamsons, USA

viii) <u>Flanges</u>

1. M/s Aditya Forge Ltd., Vadodara
2. M/s Amforge Industries Ltd., Mumbai
3. M/s CD Engineering Co., Ghaziabad
4. M/s Echjay Forgings Pvt. Ltd. (Bombay), Mumbai
5. M/s Echjay Industries Ltd., Rajkot
6. M/s Forge & Forge Pvt. Ltd., Rajkot
7. M/s Golden Iron & Steel Works, New Delhi
8. M/s JK Forgings, New Delhi
9. M/s Metal Forgings Pvt. Ltd., Mumbai
10. M/s Perfect Marketings Pvt. Ltd., New Delhi
11. M/s Sky Forge, Faridabad
12. M/s S&G, Faridabad
13. Chaudhry Hammer Works Ltd, India
14. JAV Forgings (P) Ltd, India
15. Kunj Forgings Pvt Ltd, India
16. MS Fittings
17. R.N. Gupta & Co. Ltd, India
18. R.P. Engineering Pvt Ltd, India

19. Sanghvi Forgings & Engineering Ltd
20. Shri Ganesh Forgings Ltd., India
21. Uma Shankar Khandelwal& Co., India
22. Sawan Engineers, Baroda
23. Stewarts & Lloyds of India Ltd., Kolkata
24. Engineering Services Enterprises
25. Pipefit Engineers Pvt. Ltd.

ix) Fittings

1. M/s Commercial Supplying Agency, Mumbai
2. M/s Dee Development Engineers Ltd.
3. M/s Eby Industries, Mumbai
4. M/s Flash Forge Pvt. Ltd., Vishakhapatnam
5. M/s Gujarat Infra Pipes Pvt. Ltd., Vadodara
6. M/s M.S. Fittings Mfg. Co. Pvt. Ltd., Kolkata
7. M/s Stewarts & Lloyds of India Ltd., Kolkata
8. M/s Teekay Tubes Pvt. Ltd., Mumbai
9. M/s Pipe Fit,Baroda
10. M/s Sky Forge, Faridabad
11. M/s S&G, Faridabad
12. M/s Sawan Engineers, Baroda
13. Eby Fasteners, India
14. Leader Valves Ltd, India
15. R.N. Gupta & Co. Ltd, India
16. ExtenEnggPvt Ltd
17. Sivananda Pipe & Fittings Ltd

x) Gaskets

1. IGP Engineers (P) Ltd., Madras
2. Madras Industrial Products, Madras
3. Dikson& Company, Bombay
4. Banco Products (P) Ltd., Vadodara
5. Goodrich Gaskets Pvt Ltd
6. Starflex Sealing India Pvt Ltd, India
7. Teekay Meta Flex Pvt Ltd
8. UNIKLINGER Ltd
9. HEM Engg. Corp.
10. Unique Industrial Packing Pvt. Ltd.

xi) Fasteners

1. NirekaEngg. Co. (P) Ltd., Calcutta
2. Precision Taps & Dies, Bombay
3. AEP Company, VithalUdyoug Nagar
4. Fix Fit Fasteners, Calcutta
5. Precision Engg. Industries, Baroda
6. Echjay Forgings Pvt. Ltd., Bombay
7. Capital Industries, Bombay
8. Boltmaster India Pvt Ltd, India
9. Deepak Fasteners Limited, India
10. Fasteners & Allied Products Pvt Ltd, India
11. Hardwin Fasteners Pvt Ltd, India
12. J.J. Industries, India
13. Multi Fasteners Pvt Ltd, India
14. Nexo Industries, India
15. Pacific Forging & Fasteners Pvt Ltd, India
16. Pioneer Nuts & Bolts Pvt Ltd, India

17. Precision Auto Engineers, India
18. President Engineering Works, India
19. Sandeep Engineering Works, India
20. Syndicate Engineering Industries, India

xii) Welding Electrodes

1. For Mainline – Lincoln/ Bohler make
2. For Terminal –For root pass –Lincoln/ Bohler make
   For other passes – Lincoln, D&H or equivalent make

xiii) Miscellaneous

a) Heat Shrinkable Sleeves

1. Covalence- Seal For Life (Formerly known as Raychem-Berry Plastic)
2. Canussa – CPS

b) Cold Applied Tapes

1. Denso GmBH
2. Polyken (Berry Plastics Corporation)

c) PUR Coating

1. Powercrete (Berry Plastics Corporation)

d) Casing End Closure

1. Raci, Italy
2. Raychem RPG Limited

e) Casing Insulators

1. Raci, Italy
2. Raychem RPG Limited
3. VeekayVikram

f) Rockshield

1. Raychem RPG Limited

g) Warning Mat

1. To be procured as per Past Track Record (PTR) approval.

h) High Build Epoxy Coating

1. Berry Plastics – Powercrete
2. Specialty Polymer Canada
3. Denso Protal, Canada

B) **NDT AGENCY**

1. NDT Services, Ahmedabad
2. GEECY Industrial Services Pvt. Ltd., Mumbai
3. Corrosion Control Services, Mumbai
4. Perfect Metal Testing & Inspection Agency, Calcutta
5. Inter Ocean Shipping Co., New Delhi

6. RTD, Mumbai
7. Sievert, Mumbai
8. X-Tech, Vizag
9. Industrial X Ray and Allied Radiographers (I) Pvt. Ltd.
10. Inspection Technic, Mumbai

C) **LONG RADIUS BENDS**

i) M/s BHEL, Trichy, Tamilnadu
ii) M/s Jindal SAW Limited, (Koshi Works), U.P.
iii) M/s PSL Limited, Gandhidham, Gujarat
iv) M/s Welspun, Gujarat
v) M/s Fabricon, Belgium
vi) M/s Sawan
vii) M/s Gujarat Infra
viii) M/s P K Tubes
ix) M/s DEE Development
x) Pipefit Engineers Pvt. Ltd.

For Suppliers' list of other disciplines, refer Particular Job Specification of the respective discipline.

1) For procuring bought out items from vendors other than those listed above, the same may be acceptable subject to the following: -

a) The vendor/ supplier of bought out item(s) is a manufacturer/ supplier of said item(s) for intended services and the sizes being offered is in their regular manufacturing/ supply range.
b) The vendor / supplier should not be in the Holiday list of IGGL / MECON / other PSU.

c) Should have supplied at least one single random length (i.e. 5.5 meters to 6.5 meters) for item assorted pipes / tubes and for other items, which are to be supplied in quantity on number-basis (other than assorted pipes / tubes) minimum 01 (One) number of same or higher in terms of size and rating as required for intended services.

The bidder should submit documentary evidences i.e. PO copies, Inspection Certificate etc. for the above for approval to IGGL / MECON

2) For any other item(s) for which the vendor list is not provided, bidders can supply those item(s) from vendors/ suppliers who have earlier supplied same item(s) for the intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supply range.

The bidder is not required to enclose documentary evidences (PO copies, Inspection Certificate etc.) along with their offer, however in case of successful bidder, these documents shall required to be submitted by them for approval to IGGL / MECON.

3) The details of vendors indicated in this list are based on the information available with MECON. Contractor shall verify capabilities of each vendor for producing the required quantity. PMC does not guarantee any responsibility on the performance of the vendor. It is the contractor's responsibility to verify the correct status of vendor and quality control of each party and also to expedite the material in time.

4) Any vendor whose name does not appear above but if the same is registered with MECON CVDC, then those vendors are also acceptable for supply of relevant items.

20.0 MINIMUM NO. OF CONSTRUCTION EQUIPMENT TO BE DEPLOYED DURING RE-MOBILISATION

(Appendix-X to Particular Job Specification of Work)

APPENDIX - X to PJS

MINIMUM NO. OF CONSTRUCTION EQUIPMENTS TO BE DEPLOYED DURING RE-MOBILIZATION

Sl. No.	Equipment Detail	Total Minimum Equipment Mobilization, Nos.
1	Excavator / Back Hoe-Ex 280 & Above or Equivalent	2
2	Excavator / Back Hoe-Ex 200 & Above or Equivalent	2
3	Pipe Layer/Side Boom – 60 T & Above Capacity	1
4	Pipe Layer/Side Boom – 40 T & Above Capacity	1
5	Pipe Bending Machine as per line size	1
6	Dozer with Ripper – D7/D6 or Equivalent	1
7	DG Welding Machines	4
8	Farana/ Hydra (8 – 12 MT)	1
9	Pipe Clamp (Pneumatic/Hydraulic) – Internal	1
10	X-Ray M/C – Internal Crawler	1
11	X-Ray M/C – External	1
12	Gamma Source	1
13	Water Lifting Pump (400 m^3/hr. & above)	1
14	Filling Pumps (400 TO 1000 M^3/HR)	1
15	Pressurization Pump – Motorized	1
16	Air Compressor – (300CFM)	1
17	D.G. Sets: 62.5 KVA to 200 KVA (inclusive of generators)	2
18	Blast Cleaning Machine	1
19	Pipe Trailers (FB / Semi Low Bed)	1
20	Hand drill (pneumatic) for rock blasting	2
21	Dozing Pump	1

Note: The above schedule shall be only considered for the Re-mobilization period of 1 month. Based on site conditions, revised equipment requirement shall be worked out by IGGL/ PMC/ Contractor for subsequent months. The decision of EIC shall be final and binding.

21.0 MINIMUM NO. OF SKILLED MANPOWERTO BE DEPLOYED DURING RE-MOBILISATION

(Appendix-XI to Particular Job Specification of Work)

APPENDIX - XI to PJS

MINIMUM NUMBER OFSKILLED MANPOWER TO BE DEPLOYED DURING REMOBILISATION

Sl. No	DESCRIPTION	REQUIREMENT
1.	Resident Construction Manager	1
2.	Planning engineer	1
3.	QA/ QC engineer	1
4.	Safety officer	1
5.	Qualified Surveyor	1
6.	Welding/ NDT engineer	1
7.	Discipline Engineer's (Civil/ Mech.)	1/1
8.	Foreman / Supervisor	4
9.	Civil surveyor / liaison team consisting of 2 (two) members	1
10.	Document controller / Account Officer (for line pipe)	1
11.	Store keeper / store in-charge	1
12.	Welder	8
13.	Fitter	4
14.	Grinder	4
15.	Machine operator	1
16.	Blast cleaning crew consisting of 4 (four) persons (i.e.; sand Blaster + 03 unskilled worker)	1
17.	Electrician / Machine mechanic	2
18.	Rigger	4
19.	Pipe bender	1
20.	X-ray / Gamma Ray crew Consisting 2 (Two) persons (i.e.; Supervisor ANST level-I + unskilled worker	1
21.	Hydro-testing crew consisting 04 persons (i.e.; Hydrotesting Supervisor + Filler+ 02 unskilled worker)	1
22.	Field joint coating crew consisting 03 persons (i.e.; Insulator - 02 Nos + 1 Unskilled Worker)	1
23.	Holiday testing crew consisting 02 persons (i.e.; Insulator + Unskilled Worker)	1
24.	OFC jointing crew consisting 2 Persons (Cable Jointer + Unskilled Worker)	1
25.	Civil survey crew (with equipment) consisting 02 persons (ie; Qualified surveyor + unskilled Worker)	1
26.	Unskilled workers	5
27.	Station mechanical, pre-fabrication / erection crew	1

The above proposed list of skilled manpower is the minimum to be deployed by Contractor.

NOTES: -

(1) The above schedule shall be only considered for the Re-mobilization period of 1 month. Based on site conditions, revised manpower requirement shall be worked out by IGGL/ PMC/ Contractor for subsequent months. The decision of EIC shall be final and binding.

22.0 SCHEDULE OF DOCUMENT SUBMISSION

(Appendix-XII to Particular Job Specification of Work)

APPENDIX-XII TO PJS

SCHEDULE OF SUBMISSION OF DOCUMENTS

Project Name: LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S IGGL (24" x174.236 Km & 24" x 6.027 Km)

CLIENT: M/s Indradhanush Gas Grid Limited (IGGL) **Date of FOA**

CONTRACTOR:

SL. NO.	DOCUMENT TITLE	SUBMISSION OF DOCUMENT			
LIST OF PROCEDURES					
Mainline Works					
1	Electrode Qualification Test	Within 30 days from FOA			
2	Welding Procedure Qualification/ Specification (WPS)	Within 30 days from FOA			
3	Welder Performance Qualification	Within 30 days from FOA			
4	Route Survey	Within 30 days from FOA			
5	Clearing and Grading of ROW	Within 30 days from FOA			
6	Stringing of Line Pipes	Within 30 days from FOA			
7	Production Welding	Within 30 days from FOA			
8	Repair of Arc Strike	Within 30 days from FOA			
9	Weld Joint Numbering	Within 30 days from FOA			
10	NDT (X-Ray and Gamma Ray)	Within 30 days from FOA			
11	NDT Ultrasonic	Within 30 days from FOA			
12	Liquid Penetrant Test	Within 45 days from FOA			
13	Magnetic Particle Test	Within 45 days from FOA			
14	Welding Repair	Within 30 days from FOA			
15	Field Joint Coating & Repair	Within 30 days from FOA			
16	Trench Excavation	Within 45 days from FOA			
17	Rock Blasting	Within 30 days from FOA			
18	Lowering and Backfilling of Pipe Section	Within 45 days from FOA			
19	Tie-in Welding	Within 45 days from FOA			
20	Cold Field Bending	Within 45 days from FOA			

APPENDIX-XII TO PJS

SCHEDULE OF SUBMISSION OF DOCUMENTS

Project Name: LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S IGGL (24" x174.236 Km & 24" x 6.027 Km)

CLIENT: M/s Indradhanush Gas Grid Limited (IGGL) **Date of FOA**

CONTRACTOR:

SL. NO.	DOCUMENT TITLE	SUBMISSION OF DOCUMENT			
21	Transportation, Handling and Storage of Line Pipes, Materials and Equipment	Within 30 days from FOA			
22	Incoming Material Inspection	Within 45 days from FOA			
23	Health, Safety And Environment	Within 30 days from FOA			
24	Quality Assurance Plan	Within 30 days from FOA			
25	Open Cut Crossings	Within 60 days from FOA			
26	Cased Crossing -Boring	Within 60 days from FOA			
27	HDD	Within 60 days from FOA			
28	Pre- Hydrotesting	Within 60 days from FOA			
29	Mainline Hydrostatic Testing	Within 60 days from FOA			
30	Post Hydrotesting	Within 90 days from FOA			
31	Pre-commissioning (Dewatering, Swabing and Drying of Pipeline	Within 90 days from FOA			
32	Magnetic Cleaning	Within 90 days from FOA			
33	EGP	Within 90 days from FOA			
34	Nitrogen Purging	Within 90 days from FOA			
35	SV Installation	Within 90 days from FOA			
36	Restoration	Within 90 days from FOA			
37	Permanent Markers	Within 90 days from FOA			
38	Commissioning	Within 90 days from FOA			
39	Videography before construction and after construction	Within 90 days from FOA			
40	Pipe Book	Within 60 days from FOA			
41	Final Acceptance dossier	Within 90 days from FOA			

APPENDIX-XII TO PJS

SCHEDULE OF SUBMISSION OF DOCUMENTS

Project Name: LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S IGGL (24" x174.236 Km & 24" x 6.027 Km)

CLIENT: M/s Indradhanush Gas Grid Limited (IGGL) **Date of FOA**

CONTRACTOR:

SL. NO.	DOCUMENT TITLE	SUBMISSION OF DOCUMENT			
Station Works (Mechanical)					
1	Piping,Fabrication and erection of above ground piping	Within 60 days from FOA			
2	Welding Procedure Specification (Piping)	Within 60 days from FOA			
3	Hydrotesting / Leak Test	Within 60 days from FOA			
4	Painting of structural / piping	Within 60 days from FOA			
5	Equipment erection and Alignment	Within 60 days from FOA			
6	NDT and Radiography	Within 60 days from FOA			
Instrumentation/ Telecom Works					
1	HDPE Duct laying & Testing	Within 30 days from FOA			
2	Field Instrument installation & Commissioning	Within 60 days from FOA			
3	OFC Laying, Drum testing, OFC Jointing & Testing	Within 30 days from FOA			
4	Control Panel Installation, Cable Tray installation, Cable laying & Commissioning	Within 90 days from FOA			
Electrical, CP & CMS Works					
1	Earthing & lighting	Within 60 days from FOA			
2	Equipment & Accessories Erection	Within 60 days from FOA			
3	Conduiting & Wiring Works	Within 60 days from FOA			
4	Cable Tray Installation	Within 60 days from FOA			
5	Cable Laying, Glanding & Termination	Within 60 days from FOA			
6	Installation Procedure of various CP items at site	Within 60 days from FOA			
7	Soil Resistivity survey procedure	Within 60 days from FOA			
8	CP Pre-commissioning & commisioning procedure	Within 60 days from FOA			

APPENDIX-XII TO PJS

SCHEDULE OF SUBMISSION OF DOCUMENTS

Project Name: LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S IGGL (24" x174.236 Km & 24" x 6.027 Km)

CLIENT: M/s Indradhanush Gas Grid Limited (IGGL) **Date of FOA**

CONTRACTOR:

SL. NO.	DOCUMENT TITLE	SUBMISSION OF DOCUMENT			
9	Installation Procedure of various CMS items at site	Within 60 days from FOA			
Civil/ Structural/ Architectural Works					
1	Earth Work Excavation & Backfilling	Within 45 days from FOA			
2	Brick Masonary	Within 45 days from FOA			
3	Structural Steel Works	Within 45 days from FOA			
4	RCC Works	Within 45 days from FOA			
5	Pavement roads & drain works	Within 45 days from FOA			
6	Concrete weight coating	Within 45 days from FOA			
7	Installation of Steel/ Aluminium Doors, Windows and Ventilators	Within 60 days from FOA			
8	Plastering and Pointing	Within 60 days from FOA			
9	Sanitary Fittings	Within 60 days from FOA			
10	Plumbing & Drainage	Within 60 days from FOA			
11	Floor Finishing	Within 60 days from FOA			
12	Reinforcement	Within 45 days from FOA			
13	Bitumen Painting	Within 60 days from FOA			
14	PCC Works	Within 45 days from FOA			
15	ACC Masonary	Within 45 days from FOA			
16	Roof treatment	Within 60 days from FOA			

APPENDIX-XII TO PJS

SCHEDULE OF SUBMISSION OF DOCUMENTS

Project Name: LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S IGGL (24" x174.236 Km & 24" x 6.027 Km)

Client: M/s Indradhanush Gas Grid Limited (IGGL) **Date of FOA:**

Contractor:

SL. NO.	ITEM	PURCHASE ORDER COPY	SUBMISSION OF DOCUMENTS	FIRST LOT RECEIVED AT SITE	BALANCE MATERIAL RECEIVED AT SITE	MINIMUM MATERIAL IN STOCK AT ANY TIME AFTER RECEIPT OF FIRST LOT	REMARKS
	QAP						
1	Warning mat	Within 30 days from FOA	Within 37 days from FOA	Within 45 days from FOA	Within 150 days from FOA	For a pipeline length of minimum 10 Kms	
2	Casing Pipe/ CS Conduit	Within 45 days from FOA	Within 60 days from FOA		Within 180 days from FOA	For a pipeline length of minimum 5 Kms	
3	HDPE Duct	Within 30 days from FOA	Within 37 days from FOA	Within 45 days from FOA	Within 150 days from FOA	For a pipeline length of minimum 10 Kms	
4	Insulator	Within 30 days from FOA	Within 45 days from FOA	Within 60 days from FOA	Within 180 days from FOA	As per Crossing Execution	
5	Scrapper Trap	Within 45 days from FOA	Within 75 days from FOA		Within 220 days from FOA		
6	Insulating Joint	Within 45 days from FOA	Within 75 days from FOA		Within 180 days from FOA		
7	CP material	Within 30 days from FOA	Within 45 days from FOA	Within 90 days from FOA	Within 180 days from FOA	For a pipeline length of minimum 10 Kms	
8	LR Bend	Within 30 days from FOA	Within 45 days from FOA	Within 105 days from FOA	Within 120 days from FOA		
9	Assorted Pipe	Within 30 days from FOA	Within 45 days from FOA	Within 120 days from FOA	Within 150 days from FOA		
10	Valves	Within 45 days from FOA	Within 60 days from FOA		Within 240 days from FOA		
11	Fittings & Flanges	Within 45 days from FOA	Within 60 days from FOA	Within 120 days from FOA	Within 150 days from FOA		
12	Stud, nuts and gaskets	Within 30 days from FOA	Within 45 days from FOA	Within 90 days from FOA	Within 150 days from FOA		
	DESIGN APPROVALS						
1	CP design approval	Within 45 days from FOA	Within 60 days from FOA				
2	HDD profile approval	Within 45 days from FOA	Within 90 days from FOA				

SCHEDULE OF SUBMISSION OF DOCUMENTS

Project Name: LAYING & CONSTRUCTION OF STEEL GAS PIPELINE AND TERMINALS ALONG WITH ASSOCIATED FACILITIES FOR DULIAJAN FEEDER LINE (DFL) PROJECT OF M/S IGGL (24" x174.236 Km & 24" x 6.027 Km)

Client: M/s Indradhanush Gas Grid Limited (IGGL) **Date of FOA:**

Contractor:

SL. NO.	ITEM	PURCHASE ORDER COPY	SUBMISSION OF DOCUMENTS	FIRST LOT RECEIVED AT SITE	BALANCE MATERIAL RECEIVED AT SITE	MINIMUM MATERIAL IN STOCK AT ANY TIME AFTER RECEIPT OF FIRST LOT	REMARKS
3	LR Bends Quantity approval	Within 30 days from FOA	Within 45 days from FOA	Within 90 days from FOA	Within 150 days from FOA		
	CONSUMABLES						
1	Coating Sleeves	Within 30 days from FOA	Within 37 days from FOA	Within 45 days from FOA	Within 180 days from FOA		
2	Electrodes	Within 30 days from FOA	Within 37 days from FOA	Within 45 days from FOA			

Note: In case of delay in above mentioned schedule, Recovery shall be applied at the rate of INR 10,000 per Procedure/ Drawing/ QAP (as applicable) limiting to maximum INR 15,00,000.00 (Fifteen Lacs). In case the Contractor achieves the contractual completion period for commissioning of the pipeline, the already deducted amount on account of delay in submission of documents shall be refunded.

23.0 STANDARD OPERATING PROCEDURE

(Appendix-XIII to Particular Job Specification of Work)

STANDARD OPERATING PROCEDURE

LAYING NEW PIPEINE IN COMMON ROW PARALLEL TO EXISTING PIPELINES

1. Purpose:

Ensuring Safety and preventing damage to existing pipeline(s) during laying of new pipeline in Common ROW.

2. Scope:

This SOP attempts to define roles and responsibilities of the concerned construction in-charge from CLIENT, Contractor, PMC and concerned Process Owner of the ROW.

This SOP shall be applicable where the pipeline is being laid in common ROW, parallel to an existing pipeline –of all sizes; in operation including de-commissioned pipeline.

2.1 Exclusion:

This SOP shall not be applicable for abandoned pipeline sections in the existing ROW.

3. Different Kind of Activities:

1. ROW grading
2. Identification of existing pipeline (s)
3. Marking of existing pipeline (s)
4. Digging of Trench
5. Line Pipe Stringing
6. Welding and joint coating
7. Line Pipe Lowering
8. Back filling
9. Restoration of ROW

4. Roles and Responsibilities:

Roles and responsibilities of various stakeholders are as given below:

4.1 Construction in-charge: Construction in-charge from CLIENT shall be responsible to ensure compliance to the activities in the attached checklist by all concerned at all the time during execution of the Job in ROW.

4.2 PMC: Project Management Consultant being the EIC of the contract shall ensure compliance of the activities as defined in the checklist, by the contractor at all the time during execution of the Job in ROW.

4.3 Contractor: Contractor engaged for executing of pipeline laying activities, shall, at all the time, strictly comply and ensure the activities described in the attached checklist.

The Contractor shall be held responsible for any untoward incident due to not following the instructions contained in this SOP/Checklist.

4.4 Concerned Process Owner: Concerned Process Owner shall be responsible to ensure accurate marking of the existing pipelines and compliance to other activities as described in the checklist. Concerned Process Owner is also responsible to ensure that work is being carried out as per the permission given to Construction department.

5. Resource Requirement:

a) GPS Device
b) XYX report of Pigging of Existing Line, for Coordinates of existing Line which also shows if any leak clamps / repairs fixed on line, for precautions to be taken during excavation near to such locations.
c) Repair history of Pipe Line after In Line inspection-Chainage wise (& GPS) details.
d) Alignment sheets of Existing Pipe Line – Updated with Crossings permitted after laying of Line. All new crossings to be physically marked prior to start of job for additional precaution, to avoid damage to 3rd party.
e) Coating Repair kit, in case of any coating damage to Existing coating during Excavation.
f) Leak Clamp with Non-sparking tools; in case of line puncture during excavation /Leak observed during Excavation.
g) Gas Leak Detector
h) Fire extinguishers.
i) Route maps of Existing Pipe Line.
j) List of markers with chainage details of existing Line. (Latest report signed by P/L HOD of Existing line and Project in charge of new Line). For verification after completion of job.
k) Pipeline Locator
1) Measurement Tape
m) Tools for Digging
n) Wooden Rods / Ranging Rods with red flags
o) Nylon Rope / Warning Tape
p) Lime Powder

6. Safety PPEs:

a. Cotton dress
b. Safety Shoes
c. Cotton hand gloves
d. Hard Helmet
e. Specific PPEs used during Welding, NDT etc.

7. Do's and Don't's

As per enclosed checklist

8. Definitions:

Abandoned Pipeline: A pipeline which has been duly decommissioned after following proper procedure and scrapped & and not to be taken in operation in future.

De-commissioned Pipeline: A pipeline which has been taken out of service to carryout maintenance work etc.

Operational Area: Area of existing pipeline in ROW.

Concerned Process Owner: Process Owner in-charge or his authorized representative not below the rank of Manager.

9. Procedure:

Laying of new pipeline in common ROW parallel to exiting pipelines requires utmost care to be undertaken by all concerned.

Various activities as detailed below are to be ensured for compliance by following officials (as listed out):-

i). CLIENT -Construction site I/C not below manager
ii). CLIENT -Process Owner or his representative not below Manager
iii). Project Management Consultant
iv). Construction Contractor Site In-charge

Following steps are to be taken:

1. Identification of existing pipelines/Utilities running along the ROW completed with the help of pipe locator.
2. Marking of left and right side of ROW verified with reference to direction of flow and completed with boundary pillars.
3. Location of the existing lines marked with continuous lime powder wherever feasible and installation of wooden stick/ranging rod firmly grounded with at least 1.0 mtr clear height from ground level; with red flags at interval of 50 mtr completed.
4. Physical verification by manual digging check pit at a distance of 500 mtrs completed for confirmation of indicated location by pipe locator. All bends are to be physically identified.
5. Marking of working area boundary at a distance of atleast 1.5 mtrs from last existing pipeline/utility towards the proposed working side for new pipeline completed.
6. Clear distance of 5 mtr between existing line and new line to be maintained.

7. Barricading by installation of wooden rods / ranging rods on working area boundary, at a distance of 2-3 mtrs & tied with nylon rope/ warning tape completed.
8. Briefing given to operators / supervisors for not crossing the barricading area and non-movement of heavy equipment over operational area.
9. ROW cleared for entry of equipments and pipeline laying activities.
10. Ensuring that the permissions / Work Permit have been taken from Process Owner / Other utility owners.
11. All risk regarding marking and barricading existing pipelines as enumerated at **Annexure-I**, are assessed and mitigation measures ensured.
12. Ensure that Safety Work Permit has been obtained and there is a safety officer to oversee the requirements of safety measures / Fire Fighting equipment during execution of job.
13. A full time supervisor of executing agency with contact number identified who shall be primarily responsible under overall control by Construction Department for above during/ throughout the work execution.
14. Ensuring that all the requirements of Work permit have been complied-**on daily basis** before start of work.

Note:

a) Joint Survey of the site by the team.
b) Compliance to the requirements stipulated in Work Permit System.
c) Refer the Checklist at **Annexure -1**.
d) Make the complete checklist as part of Work Permit.

Annexure-1

CHECKLIST FOR LAYING NEW PIPEINE IN COMMON ROW PARALLEL TO EXISTING PIPELINES

1. To be filled prior to entry of any equipment in ROW.
2. Validity period not more than one Week.

PROJECT NAME:	Date:
SECTION:	Valid till:
CHAINAGE: From	To:

S.NO.	CHECK POINTS	Responsibility		
		Compliance	Ensure Compliance	
			Primary	Secondary
1.	Identification of existing Pipelines / Utilities running along the ROW completed with the help of pipe locator.	Contractor	PMC	CLIENT Construction / Process Owner
2.	Marking of left and right side of ROW verified with reference to direction of flow and completed with boundary pillars.	Contractor	PMC	CLIENT Construction / Process Owner
3.	Location of the existing lines marked with continuous lime powder wherever feasible and installation of wooden stick / ranging rod firmly grounded with atleast 1.0 mtr clear height from ground level; with red flags at interval of 50 mtr completed.	Contractor	PMC	CLIENT Construction / Process Owner
4.	Physical verification by manual digging check pit at a distance of 500 mtrs completed for confirmation of indicated location by pipe locator. All bends are to be physically identified.	Contractor	PMC	CLIENT Construction / Process Owner
5.	Marking of working area boundary at a distance of at least 1.5 mtrs from last existing pipeline / utility towards the proposed working side for new pipeline completed.	Contractor	PMC	CLIENT Construction / Process Owner
6.	Clear distance of 5 mtr between existing line and new line to be maintained.	Contractor	PMC	CLIENT Construction / Process Owner

7.	Barricading by installation of Wooden rods / ranging rods on working area boundary, at a distance of 2-3 mtrs & tied with nylon rope / warning tape completed.	Contractor	PMC	CLIENT Construction / Process Owner
8.	Briefing given to operators / supervisors for not crossing the barricading area and non-movement of heavy equipment over operational area.	Contractor	PMC	CLIENT Construction / Process Owner
9.	ROW cleared for entry of equipments and pipeline laying activities.	Contractor	PMC	CLIENT Construction / Process Owner
10.	Ensuring that the permissions / Work Permit have been taken from Process Owner / Other utility owners.	Contractor	PMC	CLIENT Construction / Process Owner
11.	All risk regarding marking and barricading existing pipelines as enumerated at annexure-1, are assessed and mitigation measures ensured.	Contractor	PMC	CLIENT Construction / Process Owner
12.	Ensure that Safety Work Permit has been obtained and there is a safety officer to oversee the requirements of safety measures / Fire Fighting equipment during execution of job.	Contractor	PMC	CLIENT Construction / Process Owner
13.	A full time supervisor of executing agency with contact number identified who shall be responsible for above checklist during/ throughout the work execution.	Contractor	PMC	CLIENT Construction / Process Owner
14.	Ensuring that all the requirements of Work permit have been complied-**on daily basis** before start of work.	Contractor	PMC	CLIENT Construction / Process Owner

Note: A typical line diagram for ready reference is attached.

Annexure- 2: Perceived risks related to Marking and Barricading of existing pipelines / Utilities in ROW

Construction Contractor	PMC	CLIENT -Construction site 1/C not below manager	CLIENT –Process Owner or his representative not below Manager
Sign:	Sign:	Sign:	Sign:
Name:	Name:	Name:	Name:
Date:	Date:	Date:	Date:

Ref.: SOP No.....Rev.0 Annexure-2

PERCEIVED RISK RELATED TO LAYING NEW PIPEINE IN COMMON ROW PARALLEL TO EXISTING PIPELINES

1. Possibility of damage to the existing pipelines/utilities due to –
    a. Lack of awareness about exact location of existing pipelines/utilities.
    b. Lack of awareness of impact of accidental damage to the existing pipelines / utilities.
    c. Wrong marking of existing pipelines / utilities.
2. Turning points / bends may not be accurately located and marked.
3. Delay in construction in absence of clarity of ROW and unforeseen surprises if work area is not clearly marked.
4. Identification of responsible person to ensure adherence to SOP.

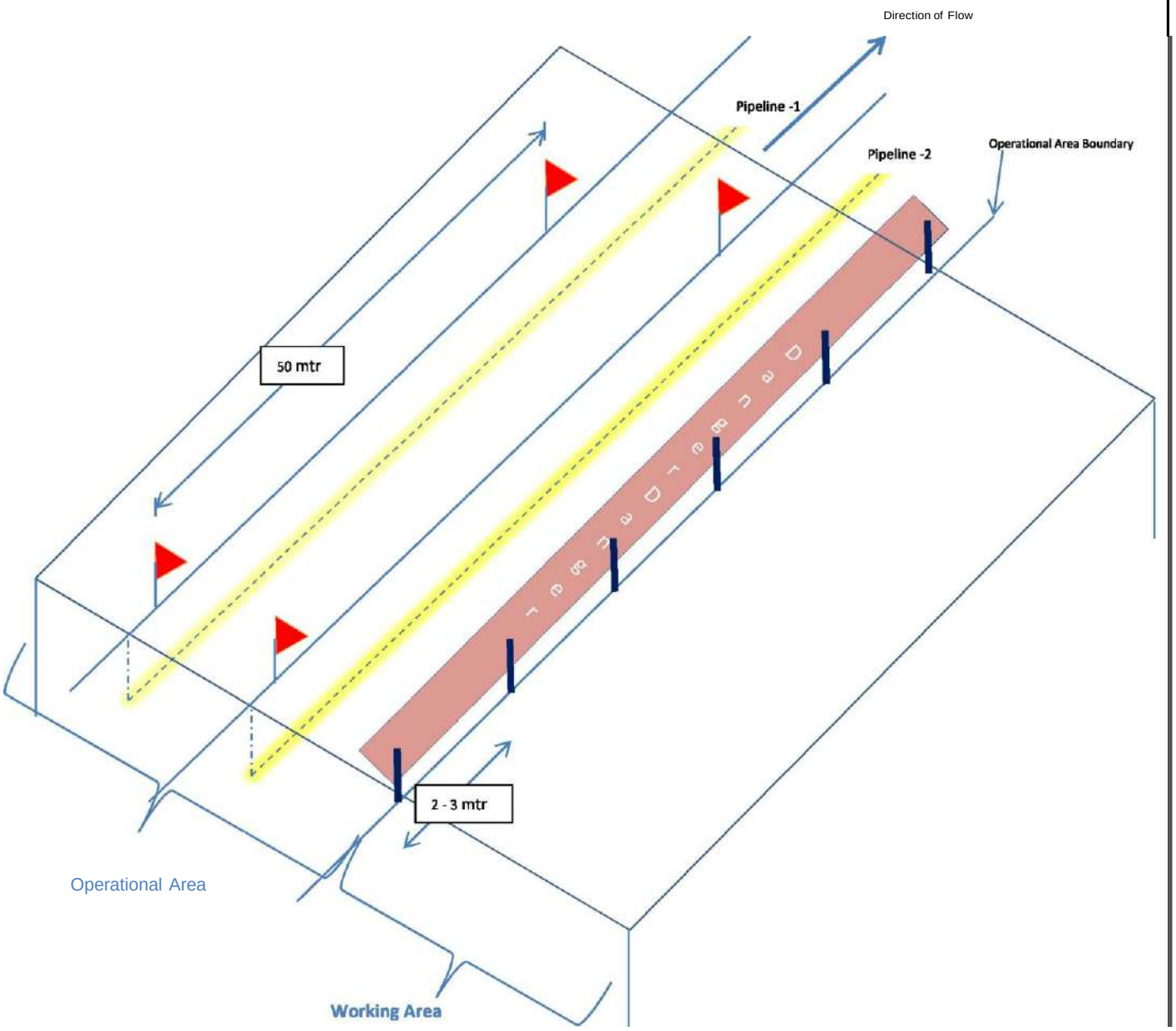

Figure 1A Typical Line Diagram for marking Operational Area

24.0 DETAILS OF SHARED ROU

(Appendix-XIV to Particular Job Specification of Work)

ROU LINE DIAGRAM

Name of the Project: Duliajan Feeder Line (DFL)

Client : M/s IGGL | **PMC : M/s MECON**

24'' x 174.236 KM

Chainage	1 Km	2 Km	3 Km	4 Km	5 Km	6 Km	7 Km	8 Km	9 Km	10 Km	11 Km	12 Km	13 Km	14 Km	15 Km	16 Km	17 Km	18 Km	19 Km	20 Km	21 Km	22 Km	23 Km	24 Km	25 Km
DT																SV-01									
RoU																									
Status																									

Chainage	26 Km	27 Km	28 Km	29 Km	30 Km	31 Km	32 Km	33 Km	34 Km	35 Km	36 Km	37 Km	38 Km	39 Km	40 Km	41 Km	42 Km	43 Km	44 Km	45 Km	46 Km	47 Km	48 Km	49 Km	50 Km
							SV-02												SV-03	DS-1 (Lepetkatta)					
RoU																									
Status																									

Chainage	51 Km	52 Km	53 Km	54 Km	55 Km	56 Km	57 Km	58 Km	59 Km	60 Km	61 Km	62 Km	63 Km	64 Km	65 Km	66 Km	67 Km	68 Km	69 Km	70 Km	71 Km	72 Km	73 Km	74 Km	75 Km
										SV-04											DS-2 (Moran)				
RoU																									
Status																									

Chainage	76 Km	77 Km	78 Km	79 Km	80 Km	81 Km	82 Km	83 Km	84 Km	85 Km	86 Km	87 Km	88 Km	89 Km	90 Km	91 Km	92 Km	93 Km	94 Km	95 Km	96 Km	97 Km	98 Km	99 Km	100 Km
		SV-05																IP							
RoU																									
Status																									

Chainage	101 Km	102 Km	103 Km	104 Km	105 Km	106 Km	107 Km	108 Km	109 Km	110 Km	111 Km	112 Km	113 Km	114 Km	115 Km	116 Km	117 Km	118 Km	119 Km	120 Km	121 Km	122 Km	123 Km	124 Km	125 Km
										SV-06															
RoU																									
Status																									

Chainage	126 Km	127 Km	128 Km	129 Km	130 Km	131 Km	132 Km	133 Km	134 Km	135 Km	136 Km	137 Km	138 Km	139 Km	140 Km	141 Km	142 Km	143 Km	144 Km	145 Km	146 Km	147 Km	148 Km	149 Km	150 Km
	SV-07																		SV-08						
RoU																									
Status																									

Chainage	151 Km	152 Km	153 Km	154 Km	155 Km	156 Km	157 Km	158 Km	159 Km	160 Km	161 Km	162 Km	163 Km	164 Km	165 Km	166 Km	167 Km	168 Km	169 Km	170 Km	171 Km	172 Km	173 Km	174 Km	174.236 Km
	DS-3 (Teok)								SV-09																RT
RoU																			NEGG RoU 6.5 KM (24" - IGGL / 26" - NRL)						
Status																									

Legends	RoU Width	RoU Type	Existing Facilities
	20 M	Fresh	None
	20 M	Shared - BCPL	02 P/L - 18"
	20 M	Shared - BCPL	01 P/L - 4.5"
	22-40M	Shared - ONGC	06 P/L - 20"/12"/12"/12" & 10"
	18 M	Shared - ONGC	08 P/L - 20"/12"/12"/10"/ 6" & 4"
	18 M	Shared - ONGC	03 P/L - 20"/12" & 12"
	18 M	Shared - ONGC	03 P/L - 16"/12" & 12"
	15 M	Shared - ONGC	01 P/L - 14"
	20 M	Shared - IGGL & NRL	02 P/L - 24"/ 26"

24'' x 6.100 KM

DT	1 KM	2KM	3 KM	4KM	5KM	6KM
RoU						
Status						

Legends	RoU Width	RoU Type	Existing Facilities
	20 M	Fresh	None
	20 M	Shared - BCPL	03 P/L - 18"/18" & 4.5"
	10 M	Forest	None

ANNEXURES TO PARTICULAR JOB SPECIFICATION

ANNEXURE TO PARTICULAR JOB SPECIFICATION

CONTENTS

- Annexure-I : Cathodic Protection Works
- Annexure-II : Corrosion Monitoring System Works
- Annexure-III : Civil, Architectural & Structural Works
- Annexure-IV : Instrumentation Works
- Annexure-V : Telecommunication Works
- Annexure-VI : Electrical Works
- Annexure-VII : Fire Protection Works
- Annexure-VIII : Pipeline Information Management System

Annexure-I
to
Particular Job Specification
(CATHODIC PROTECTION WORKS)

TABLE OF CONTENT

Sl No.	Description	Document No./ Drawing No.	Rev. No.	Pages
MATERIAL REQUISITION, DESIGN BASIS, SCOPE OF WORK & QAP (Quality Assurance planning) (VOL-I)				
1	Design Basis for CP system	MEC/05/E9/E/0085/E/CPDB/001	Rev. B	21
2	Scope of Work	MEC/05/E9/E/0085/E/CP/002	Rev. A	48
3	Quality Assurance Plan	MEC/05/E9/ E-0085/ QAP/082	Rev. 0	2
STANDARD SPECIFICATIONS (Vol-II)				
4	Corrosion Survey	MEC/S/05/21/016C	Rev. 3	4
5	Temporary Cathodic Protection System	MEC/TS/05/E9/016A	Rev. 0, Ed-4	21
6	Permanent Cathodic Protection System	MEC/TS/05/E9/016B	Rev. 0 Ed-4	33
7	Cathodic protection Transformer rectifier (TR) unit	MEC/TS/05/E9/082A	Rev. 3	9
8	Cathodic protection Power supply module (CPPSM)	MEC/TS/05/E9/082	Rev. 2	8
STANDARD DATA SHEETS (Vol-II)				
9	Cathodic protection Transformer rectifier (TR) unit	MEC/DS/05/E9/082A	Rev. 1	6
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INDRADHANUSH GAS GRID LIMITED

DESIGN BASIS FOR CATHODIC PROTECTION SYSTEM

DULIAJAN FEEDER LINE (FROM CGGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)

MECON LIMITED DELHI
(ELECTRICAL SECTION)

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APPENDIX-I : LIST OF ABBREVIATIONS

Rev. No.	Date	Prepared By	Checked By	Approved By
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1.0 INTRODUCTION

Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, GAIL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. As per Hydrocarbon Vision 2030 for North East India, North East Gas Grid (NEGG), a natural gas pipeline network, is being set up to connect the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni Guwahati Gas Pipeline. The project is being implemented in three phases based on the requirement of statutory clearance, route terrain, linkage with Highway corridor widening works, difficulty in work execution etc. for the development of a gas-based economy in North-Eastern India.

As per the mandate of the Cabinet Committee on Economic Affairs (CCEA), the NEGG is to connect all the eight Northeastern states to the National Gas Grid for the development of a gas-based economy in the Northeast in line with the Hydrocarbon Vision 2030 for the Northeast. It is also mandated by the CCEA to connect all the regional gas sources of the Northeast for early monetization of natural resources and to boost Exploration & production (E&P) activities in the region.
The natural gas pipeline grid would have the facility for injection of indigenously produced gases also. Connectivity from local marginal fields as well as source line/spur lines into North-East Gas Grid has been considered. The upstream source/ pipeline operator would make necessary arrangements for availability of requisite pressure at source for gas injection into the grid, as per the hydraulics.

M/s IGGL has awarded M/s MECON Limited as project management consultancy (PMC) services for proposed 24″NB X 176.120 Kms. (appx.) cross-country pipeline from Dispatch Terminal at CGGS Madhuban of OIL to existing SV-14 of GNPL at Jorhat-IGGL connectivity along with associated facilities. The Scope also includes a proposed 24″NB X 6.100 Kms. (appx.) cross-country pipeline from Dispatch facility at BCPL Lepetkata Plant to receiving (cum injection point) at Jokai Lepetkata along with associated facilities. The total proposed pipeline length is 24″ NB × 182.220 km (appx.). (Refer attached Schematic drawing) Salient features of the Project are as below:

Product: NG
Pipeline Size: 24”/6”
Pipeline Coating -3LPE
Refer table-1 for details of pipeline under this package.

This document presents design criteria for TCP & PCP system for 3LPE Coated pipeline against corrosion for a service life of 30 years. It indicates minimum requirements for detailed design of CP system and equipment.

In case of any conflict between the design basis &codes/ standards listed, the same shall be brought to the notice of Owner/Consultant for final decision, stringent of the same shall be followed without any additional time and cost to IGGL.

2.0 SCOPE

Survey, Design, detailed engineering, supply, packing, transportation to site, installation, testing and commissioning of the temporary cathodic protection system using Mg/Zn galvanic

anodes for design life of minimum 2 years or till the commissioning of PCP system whichever is later & ICCP based Permanent Cathodic Protection system for design life of 35 years to protect the external surface of Pipeline against corrosion (Pipeline details are mentioned in table-1). TCP & PCP system shall be designed as per MECON's standard Specification No. MEC/S/05/E9/016A, 16B & 16C for Temporary & Permanent cathodic protection system and soil resistivity survey, scope of Work, Data Sheets & Other relevant standards.

Pipeline	Location		Diameter/ Thickness	Approx. Length (Km)
	From	To		
DULIAJAN FEEDER LINE	Dispatch Terminal at CGGS Madhuban	SV-14 of GNPL	**24"**	**176.120 Kms (Approx.)**
Connectivity line	Dispatch facility at BCPL Lepetkata Plant	receiving (cum injection point) at Jokai Lepetkata	**24"**	**6.100 Kms (Approx.)**

Table-1, Pipeline details

CP Design review and certification & Site Inspection-

All CP design shall be reviewed by the Min NACE CP Level#3/Level#4 certified personnel and all site inspection work shall be witnessed by Min NACE CP Level#1 personnel as site in charge.

3.0 CODES & STANDARDS

The system design, performance and materials to be supplied shall, unless otherwise specified, conform to the requirements of the following latest relevant applicable specifications:

1.	ASTM G 57	:	Standard Test Method for Measurement of Soil Resistivity Using the Wenner Four-Electrode Method
2.	NACE Standard SP-0169	:	Standard Practice Control of External Corrosion on Underground or Submerged Metallic Piping Systems.
3.	NACE Standard SP-0177	:	Standard Practice Mitigation of Alternating Current and Lightning Effects on Metallic Structures and Corrosion Control System.
4.	NACE Standard SP-0286	:	Standard Practice the electrical isolation of Cathodically Protected Pipelines.
5.	NACE Standard SP-0572	:	Standard Practice for Design, Installation & Operation of Impressed Current Deep Ground beds
6.	NACE Standard SP-200	:	Standard Practice for Steel Cased Pipeline Crossings
7.	NACE Standard SP-0104	:	The Use of Coupons for Cathodic Protection Monitoring Applications
8.	BS EN 13636	:	Cathodic protection of buried metallic tanks and related piping
9.	IS: 7098 Part I	:	XLPE insulated cables.
10.	IS: 1554 Part I & II	:	PVC Insulated heavy duty electrical cables.

11.	IS: 8062	:	Code of practice for cathodic protection of steel structures
12.	NACE TM 0497	:	Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Piping Systems
13.	NACE SP21424	:	Alternating Current Corrosion on Cathodically Protected Pipelines: Risk, assessment, mitigation & monitoring
14.	ISO 15589-1	:	Petroleum, petrochemical and natural gas industries — Cathodic protection of pipeline systems —Part 1: On-land pipelines
15.	ISO 21857	:	Petroleum, petrochemical and natural gas industries — Prevention of corrosion on pipeline systems influenced by stray currents
16.	ISO 22426:2020	:	Coupons **used in cathodic protection (CP)** systems to assess their effectiveness on buried and immersed metallic structures like pipelines
17.	ISO-16440-2016		Petroleum and natural gas industries — Pipeline transportation systems — Design, construction and maintenance of steel cased pipelines
18.	OISD 113	:	Classification of Area for electrical installations at Hydrocarbon processing and handling facilities
19.	OISD 141	:	Design and requirement of Cross Country Pipelines
20.	OISD 241	:	Guidelines for Integrity Assessment of Cross Country Pipelines
21.	OISD 188	:	Corrosion Monitoring of Offshore & Onshore
22.	NACE TM0101	:	Measurement techniques related to criteria for cathodic protection
23.	ASTM B418	:	Cast and Wrought Galvanic Zinc Anodes
24.	ASTM B843	:	Magnesium Alloy Anodes for cathodic protection
25.	ASTM G57	:	Field measurement of soil resistivity using wenner four pin electrode method
26.	NACE SP0502	:	Standard Practice Pipeline External Corrosion Direct Assessment Methodology
27.	NACE SP0207	:	Performing Close-Interval Potential Surveys and DC Surface Potential Gradient Surveys on Buried or Submerged Metallic Pipelines
28.	NACE TM0102	:	Measurement of Protective Coating Electrical Conductance on Underground Pipelines

29.	ISO 18086	:	Corrosion of metals and alloys — Determination of AC corrosion — Protection criteria
30.	BS EN 50162	:	Protection against corrosion by stray current from direct current systems
31.	BS EN 15280	:	Evaluation of AC corrosion likelihood of buried pipelines applicable to cathodically protected pipelines
32.	IS/IEC 60079	:	Electrical apparatus for explosive gas atmospheres – general requirements
33.	IS 3043	:	Code of practice for Earthing
34.	IS 5571	:	Guide for selection of electrical equipment for hazardous Area
35.	IS 5572	:	Classification of hazardous areas (Other than mines) having flammable gases and vapours for electrical installations.
36.	IS/IEC 62305	:	Protection Against Lightning
37.	IEC 60529	:	Degrees of Protection Provided by Enclosures (IP Code)

- PNGRB Guideline for Cross country pipelines
- A.W. PEABODY-Book on control of pipeline corrosion
- Latest IE rules/ CEA rules.

API RP 500 Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities

OISD-STD-137 Inspection of electrical equipment

OISD-STD-141 Cross country liquid hydrocarbon pipeline

PNGRB-G.S.R.
Infra/ T4S/ P&PPL/01 Technical Standards and Specifications including Safety Standards for Petroleum and Petroleum Products Pipelines

1.1 In case of imported equipment standards of the country of origin shall be applicable if these standards are equivalent or stringent than the applicable Indian standards.

1.2 In case Indian standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.

1.3 The equipment shall also confirm to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.

1.4 In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern with no additional time and cost to Owner, stringent of the same shall be followed without any additional time and cost to Owner/PMC.

- Statutory regulations.
- Schedule of rates.
- Design Basis.

- Data sheets.
- Scope of Work/ Job specification.
- Standard Specification.
- Codes and standards.

4.0 SITE CONDITIONS

The equipment offered and the installation shall be suitable for continuous operation under the following site conditions:

Ambient temperature	:	50°C/ 2˚C (Max./Min)
Max relative humidity	:	90%
Altitude	:	less than 1000 m
Atmosphere	:	To withstand site condition (High Temperature during summer and Low temperature during winter)

5.0 AREA CLASSIFICATION

Classification of hazardous area will be in accordance with BIS and IS: 5572.

Following selection will be considered for proper selection of electrical equipment for use in hazardous area:

a) Area Classification : Zone-1 & Zone 2

b) Gas Group : IIA and IIB

c) Temperature Classification : T3

All electrical equipment installed in hazardous area will be selected as per IS: 5571.

All the electrical equipment for hazardous areas shall be of Ex-d type suitable for temp classification T3 and shall be certified by CMRI or equivalent independent testing agency and shall have valid PESO license.

6.0 POWER SUPPLY DETAILS FOR CP SYSTEM

For all stations (DT & RT) along the pipeline, Power supply to CP system (TR unit) shall be as follows-

i) 230V AC+/- 10%, 50 Hz+/- 5% -Power Supply for CP TR units though UPS

For all stations (SV & IP) along the pipeline, Power supply to CP system (CPPSM unit) shall be as follows-

ii) 48V DC+/- 1% -Power Supply for CPPSM units though solar system.

7.0 CATHODIC PROTECTION SYSTEM DESIGN

7.1 Temporary Cathodic Protection (TCP) system

A.	Type	Sacrificial type CP system
B.	Protection to Pipeline (TCP) after lowering	Immediately after lowering but not later than 30 days from the time of lowering of pipeline segments (**Refer penalty clause in the scope of work for further delay)**
C.	Design life	2 Year or till commissioning of PCP whichever is later. In case of commissioning of PCP is delayed, Pipeline contractor shall ensure that pipeline is fully protected by installing additional anodes for extending the life.
D.	Pipeline coating	Three Layer Polyethylene
E.	Protective current densities	As mentioned in Table#2
F.	CP protection criteria	As mentioned in cl no 10
G.	Anode material (for sacrificial CP System)	Sacrificial (Mg/Zn) anodes (Mg anodes- High/ Low potential type) Selection shall be based on soil analysis data. For HDD crossings High potential type Anodes shall be used.
H.	No. of test stations	At an average distance of 1Km interval along the pipeline ROW and additional test stations as per standard specification for TCP. Connection scheme shall be – A type – Potential measurement B type - Every 5 KM. C type - Casing E type- Insulating Joints [R-B] F type -Foreign Pipeline Bonding H type- HT line crossing. (Refer test station schematic drawings attached with the tender document)
I.	Electrical resistance probes	Shall be provided as per specification
	a) Quantity of E/R probes (External)	As per SOR/BOQ/MR
	b) No. of E/R probe reading instrument	As per SOR/BOQ/MR
J.	DC-DC Decoupler (DCD)	Solid state type (shall be provided as per specification/scope of work) a. Fault current rating: 3.7kA @ 30 Cycle b. Lighting impulse current: 100kA (8/20 µS) c. DC blocking voltage: +2/-2V or +1/-3V as required
K.	Polarization coupons	

	a) Size of exposed area of coupon	10mm x 10 mm (100 Sq-mm) in housing of 100x100 mm (as per the requirement of NACE SP104:2014)
	b) No. of coupons & magnetic devised with reed switch	As per scope of work (Min 1 at every 5 KM with magnetic reed switches) and additional locations in corrosion prone area observed during the soil survey. Location To be decided by Contractor in consultation with Owner/ Consultant HDD crossings- on both side of HDD crossings.
	c) Proposed location of E/R probes / Polarization Coupons	To be decided by CP contractor during detail engineering based on specifications and in consultation with the Owner/Consultant
L.	CP at cased crossings	Cl no 9 of design basis shall be followed.
M.	Surge Arrestor (Spark-Gap type)- Surge arrestor shall be suitable for the installation in explosion proof area	Shall be provided at Insulating joints and shall be rated for the lightning and surge protection (100kA for -10/350 uS lighting current and 8/20 uS surge current). There shall be no joints in Surge diverter cable across the IJ.
N.	Additional protection of IJ at RT/DT & IP terminals	Solid state DC De-coupler shall be considered along with ZN earthing on protected side pipeline at IJ installation. [R-B] Earthing -ZN grounding shall be considered (Min 20 KG- 02 nos) with resistance limited to 01 Ohm.
O.	Earthing of MOVs	All MOVs installed on the cross-country portion shall be double earthed through solid state DC de-coupler (DCD) and zinc anodes, so that it will not allow CP current to drain. Armour of cables of MOVs installed on the cross-country portion shall be disconnected at MOV end so that it will not allow CP current to drain. Earthing of DCD – ZN grounding shall be considered (Min 20 KG- 02 nos) with resistance limited to 01 Ohm.
P.	TLP inside the stations shall be FLP type	TLP installed in the stations shall be PESO approved, FLP type.
Q.	Internal Corrosion Monitoring system (Coupons and Probes)	CP & CC at DT & RT- Terminal (Refer P&ID) [R-B] Refer technical specification & scope of work for internal corrosion monitoring system. Doc no- **MEC/05/E9/E/0085/E/ICMS /001**
R.	Coating integrity test at HDD	Coating integrity tests shall be carried out at HDD section before tie in to the main pipeline by temporary anode beds. (Refer scope of work for the procedure for CIT testing at HDD) - Criteria for acceptance of CP current density for CIT test at HDD section is tabulated in the Table#1 Criteria for acceptance of coating condition as per the specific coating resistance shall be as follows-

		Coating conductance test shall be carried out as per NACE TM102-2023 & Coating conductance values shall be in the "GOOD" condition as per the table -5 of NACE TM102-2023

Note -1 Polarization coupons shall be installed along with the pipeline construction activities and coupons OFF PSP shall be taken during the monthly monitoring of the TCP system.

TCP Pipeline Protection current density for TCP system design

Table#2

Type of Coating	Minimum Protection current density*@30 deg C
	Temporary CP ($\mu A/m^2$)
3LPE or 3LPP	50
FBE	400
Liquid epoxy Coal tar or bituminous coating	800

Acceptable Coating current density - HDD Section during CIT test 3LPE or 3LPP	up to 20** (As per ISO 15589-1:2015)

Pipe to soil "ON" potential shall not be more negative than (-) 1.2V during TCP.

*The values given in Table 1 account for the pipelines operating at not more than 30°C temperatures. Where pipeline operating temperatures exceed 30°C a temperature correction factor shall be applied: current density value shall be increased by 25% for each 10°C rise in operating temperature above 30°C.

** During CIT test if current density found to be more than mentioned in the table, necessary corrective action shall be taken by the contractor which includes rectification of the coating defects, additional survey like – CAT Frame A/ ACVG, DCVG, specific coating resistance measurements, re-assessment of coating after rectification etc. Final decision regarding acceptance of the CIT test results and HDD section shall be taken by Client/End user, opinion of the CP specialist may be taken for further evaluation of the coating results.

7.2 Permanent Cathodic Protection (PCP) System

A.	Type	Impressed current type
B.	Design life of protection	30 Years
C.	Pipeline coating	Three Layer Polyethylene
D.	Design protection current density	As mentioned in Table#3
E.	CP protection criteria	As mentioned in cl no 10

F.	Pipeline coating resistance for CP calculation	Max. 20000 Ohm-M2
G.	Loop resistance of PCP system	< 1 Ohm, Upto 6000 Ω-Cm resistivity < 2 Ohm, for soil resistivity more than 6000 Ω-Cm & up to 20000 Ω-Cm
H.	Type of Anodes for anode ground bed	Tubular mixed metal oxide titanium tubular with individual cable termination in AJB.
I.	CPTR/CPPSM Unit	CP units are provided with GSM based interrupter to read the ON-OFF PSP.
J.	Provision of bonding of pipeline at IP station	Shall be provided with separate bond box.
K.	Bonding provision with parallel pipeline in common ROU and crossings (OIL & Gas pipeline) with external coating	Bidder shall carryout details analysis & survey for all existing pipelines protected with the CP system and review their protective current density and interference issues, After reviewing all these parameters bidder will design the specific bonding arrangements provisions to bond these pipelines in common ROU and at crossings.
L.	Overlapping in protection	Shall be provided (If one CP station failed, another nearest CP station will take care the CP protection & none of pipeline part shall be left unprotected)
M.	Anode bed configuration	Shallow/Deep well anode bed
N.	Backfill material	Carbonaceous back-fill [lubricated calcined petroleum coke breeze] with bulk density more than 1200 kg/m3.
O.	Polarization cell	Solid state type (shall be provided where ever HT line crossing is there or running parallel as per specification) Theft proof provision shall be provided in the TLP by welding the necessary clamps over the SSD. Inspection provision shall be provided in the Solid-State DC Decoupler for field testing for DC Blocking, Continuous AC Grounding and fault current.
P.	Permanent Ref Cell (PRC)	Permanent Ref cell for PCP system shall be high purity Cu/CuS04 type. For CP TR units- Nos of Ref cell - 3 nos. of permanent reference cell (electrodes) at each CP station. Additional (2 nos) ref cell shall be considered at IP/ TOP points. For unprotected side- Additional reference cell for unprotected side PSP – One reference cell shall be considered for unprotected side of IJ to measure PSP of unprotected side and shall be integrated with CPTR/PLC, further PSP reading shall

		be taken to PLC/SCADA for remote monitoring. CPTR shall also have provision to terminate the addition reference cell and 4-20mA signal to interface with PLC.
Q.	Acquisition of land or Lease (for 99 years/as per statuary regulations) for Anode bed, Anode junction boxes and anode ground bed ROU for cable laying. (Title transfer in the name of the Owner)	By Contractor
R.	Fencing of Anode Bed	Required
S.	Cathode Junction Box and Bond Junction Box	FLP Type, PESO certified suitable for Hazardous area defined in the design basis. IP-55 in case of safe area installation.
T.	All Cathodic Protection equipment shall be suitably earthed in accordance with the requirements of Indian Electricity Rules and IS: 3043	Earthing of CP unit will be carried out with the station earthing. IEC 62305 shall be considered in case of lightning on the pipeline and size of bonding conductors/grounding conductor for the impulse (10/350 us) & surge (8/20 us) shall be accordingly.
POST COMMISSIONING SURVEYS (Shall be carried our preferably one (1) month after the commissioning of Impressed Current Cathodic Protection system, during)		
U.	Close interval potential logging survey- Every 1meter	Shall be carried out on entire length of pipeline.
V.	CAT Survey (Full Length of pipeline)@ every 50m of pipeline ROW.	Shall be carried out including measurement of depth of the buried pipeline.
W.	Additional tests to be conducted for identifying pipe coating defects/ holidays CAT with frame 'A' / ACVG survey	CAT with frame 'A' / ACVG survey at Full length of pipeline. (All defects including minor holidays shall be excavated and repaired, in scope of contractor)
X.	Coating conductance survey at B type stations & Pipeline current mapping (B type TLP to be given in every 5 KM. Survey to be carried out as per NACE TM102)	Shall be carried out at Type B (Current measurement test stations installed at every 5 km on pipeline) and also calibration of the current measurement test stations for same thickness pipeline span.
Y.	AC/DC Interference Detection & Its Mitigation	Shall be carried out through software simulations as per NACE & OISD standards. Data collection of HT Line - at the time of TCP Draft report submission & Mitigation measures - at the time of TCP. Report Validation & data logging - at the time of PCP (any other mitigations are required during validation shall be provided without any price implication to owner).

Z.	AC Corrosion Coupon	Shall be provided at HT interference affected area & each HT crossings (66kV and above) to measure AC corrosion densities. Size- 1 Cm2 Shut details- bidder to provide in data sheet for current measurement
AA.	Pipeline total protective current density measurement (µ/Sq-mtr)	Shall be carried out by measurement of the total CP current in the CJB, total surface area of the structure. After completion of all post commissioning surveys, interference mitigation, before handover of the CP system to Owner.
BB.	Proposed location of CP stations/Anode	To be decided by Contractor. (However tentative location of CP station are mentioned in the Scope of Work, Exact location shall be decided in detail engineering & approval of design document in consultation with Owner/Consultant) *

CC. CP stations/ anode ground bed for Impressed current system: -

DD. Tentative locations of CP stations are mentioned in Scope of Work, actual numbers of CP stations shall be finalized during the approval of design documents submitted by the Bidder, any other proposed location shall be included during detailed engineering, if required without any cost implication. However, PCP system shall be designed in such a manner that CP stations & anode bed shall be located coinciding with SV / IP stations.

* CP stations should be decided in such manner that Odd Number CP station shall protect the full section whenever the Even number CP station between two odd number CP station fails / not working. Similarly, Even Number CP station shall protect the full section whenever an odd number CP station between Two Even numbers CP station fails / not working. Basis for such calculation, yet again shall be Theoretical Attenuation Calculations.

PCP Pipeline Protection current density for PCP system design

Table#2

Type of Coating	**PCP system design Protection current density*@30 deg C at end of life of pipeline**	**PCP system design Protection current density*@30 deg C at start of the of pipeline life**
	Permanent CP (µA/m²)	**Permanent CP (µA/m²)**
3LPE or 3LPP	50	20* (Refer Note -5)
FBE	400	150
Liquid epoxy Coal tar or bituminous coating	800	300

Note -2: - For computerized test station: Interval of data acquisition/storing may be kept for once in every hour. This feature will be helpful for detecting/trouble shooting in case of encountering any interference. However, in normal case, one reading per day is enough.

Note -3: - CPTRU shall be able to handle the full length upto the next CP Station in case of failure in next CP Station. Same shall be consider in Design & Datasheet Notes

Note-4 :- The values given in Table 2 account for the pipelines operating at not more than 30°C temperatures. Where pipeline operating temperatures exceed 30°C a temperature correction factor shall be applied: current density value shall be increased by 25% for each 10°C rise in operating temperature above 30°C.

Note-5 :- *After commissioning of the pipeline, Protective CP current densities shall be measured with respect to the acceptable criteria, if it is found more than provided in the above table contractor shall take necessary action to mitigate the same.

8.0 INTERFERENCE STUDY AND MITIGATION PROTECTION OF PIPELINE

DUE TO STRAY CURRENT INTERFERENCES -AC & DC

AC interference simulation, modeling & mitigation measure-

Pipeline Interference study shall be carried out by modeling software's for short term and long-term interferences for safe touch potentials along with AC corrosion study. Remedial measures shall be implemented in accordance with codes & standards to bring down the steady state touch voltage on pipeline below 15V (rms) for safety reasons. In addition, any AC voltage indicating a current density of 30 mA/m2 or above (assuming 1 cm2 sized area of holiday / defect) shall be grounded through solid state DC de-coupling device to reduce the AC corrosion densities below the specified.

Coating stress voltage shall be limited to 3000V for fault /conductive interference simulations at each HT crossing/ parallel running of 11kV. Simulation for this conductive interference study shall be carried out at all HT line 11KV & above.

Mitigation measures shall be considered as follows -

The pipeline shall be grounded through DC-decoupler of suitable rating (solid state) & Grounding (Zn anodes, continuous length of Zn Ribbon Anodes, Factory packed Copper conductors with back fill material etc as per specification) shall be considered for the mitigation measure during the lowering of the pipeline as detailed below.

Mitigation measures mentioned above are best of industry practice, any other mitigation measures are also accepted subject to prior approval of the same by MECON/ Owner/ End user.

Data logging interval for the interference study shall be --- 24-48 hrs.

OHPL Rating (KV)	Mitigation measure	Remarks
66kV & above	Solid state decoupler with	

Crossing & running parallel within 100 mtr of ROU on either side or less at any location.	grounding at Crossings. Regular grounding at every 1 km in case of parallel to pipeline.	
Below 66kV (33kV, 22kV & 11 kV, including 415V LT lines) Crossing & running parallel within 50 mtr of either side of ROU or less at any location.	Solid state decoupler with grounding at Crossings.* Regular grounding at every 1 km in case of parallel to pipeline.*	*In case there is AC interference & AC corrosion reported as per the criteria (during simulation, data logging) OR *In case of Coating conductance simulated results more than 3000 V in case of fault/conductive interference.
AC/DC Traction (railway, Metro line, rapid transit system, high speed corridor etc) Crossing & running parallel within 100 mtr ROU.	Solid state decoupler with grounding at Crossings. Regular grounding at every 1 km in case of parallel to pipeline.	
HVAC & HVDC (66kV and above) Underground Cable crossings / Parallel within 50 mtr of either side of ROU.	Solid state decoupler with grounding at Crossings. Grounding at entrance, exist of parallelism and at middle.	
HVAC & HVDC (Below 66kV) Underground Cable crossings / Parallel within 50 mtr of either side of ROU.	Solid state decoupler with grounding at Crossings. Grounding at entrance, exist of parallelism and at middle.	*In case there is AC interference & AC corrosion reported as per the criteria (during data logging) OR *In case of Coating conductance simulated results more than 3000 V in case of fault/conductive interference.
HVAC substation (Above 33kV) near to the pipeline within 1 kM of either side of ROU.	Solid state decoupler with grounding.	
Pole/ Plinth Mounted substation with transformer neutral near to the Pipeline (within 10 mtr or less) (11kV/0.415/ 22kV/0.415/ 33kV/0.415)	Solid state decoupler with grounding*.	*In case there is AC interference & AC corrosion reported as per the criteria (during data logging) OR *In case of Coating conductance simulated results more than 3000 V in case of fault/conductive interference.

DUE TO STRAY CURRENT INTERFERENCES -DC

DC interference simulation modeling & mitigation measure-

Interference detection & mitigation due to DC sources (i.e. HVDC transmission lines, DC traction, foreign pipelines passing parallel, crossing etc) shall be carried out as per relevant standards as mentioned in the design basis. Following shall be considered for the DC interference studies & mitigation measures shall be provided to meet the DC interference criteria as mentioned in the document-

DC interference simulation and modeling shall be carried out for the HVDC line running parallel to the pipeline. HVDC system AGB within 50KM from the pipeline.

Data logging interval for the interference study – 24-48 hrs.

1. Foreign pipeline crossings (CP protected/ No Protected)
2. Foreign/ Owner's pipeline anode bed in the vicinity
3. HVDC Transmission Line grounding bed within 50 km radius of pipeline. (Through software simulations for mono pole operations).

Mitigation measures shall be considered as follows -

a) Prevention of pickup of stray current by improved isolation or shielding. (Consideration of installation of IJ on the affected section by DC interference)
b) Re-distribution of CP current sources, adjustment of current output from mutually interfering CP power sources.
c) Installation of metallic bonds between affected structures.
d) Application of unidirectional control devices such as diodes or reverse current switches.
e) Use of galvanic anodes on the anodic section.

Mitigation measures mentioned above are best of industry practice, any other mitigation measures are also accepted subject to prior approval of the same by MECON/ Owner/ End user.

9.0 CP AT CASED CROSSINGS

i) Casing should be avoided as far as possible. If cased crossing is unavoidable, Bare casing is always recommended with selecting higher thickness allowance as per API 1102.
ii) No sacrificial anodes (ribbon anodes) shall be used inside casing & carrier annular space.
iii) No Casing filler between annular space of casing and carrier (Bentonite/Jelly/ Inhibitors etc).

10.0 CATHODIC PROTECTION CRITERIA

10.1 Cathodic Protection Criteria with Cu/Cuso4 type reference cell

Cathodic protection system shall be designed to meet the following criteria:

a) The pipe to soil potential measurements shall be between (-) 850 mV (Off) to (-) 1.18V (OFF) polarized potentials with respect to a copper/ copper sulphate reference electrode. (Measures by multimeter shall be high input impedance of 10 Mega Ohm or more).

b) As such there is no limit for maximum "ON" negative potential; however, in general, it should not be more negative than -1500 mV (Cu/CuSO4). If any special circumstances exist where an "ON" potential of more than -1500 mV (Cu/CuSO4) is required to be applied, then it shall be brought forward for Owner/Consultant approval with proper justification supported by the pipeline coating Manufacturer's recommendations.

10.2 CATHODIC PROTECTION INTEFERENCE CRITERIA

Mitigation measures shall be included whenever the following conditions are exceeded:

A. AC Interference and AC Corrosion -

For Personnel safety –

(i) The AC voltage on the pipeline should be decreased to a target value, which should be less than 15 rms V, measured over 24-hour duration.

For Pipeline Integrity & safety (AC Corrosion)–

Generally, risk of AC corrosion increases with increase in the AC induced voltage on the pipeline, It has been observed that even at low AC voltages (<1V) AC corrosion can occur if the spread resistance/bulk soil resistivity is very low. Following criteria shall be used for AC corrosion on pipeline -

(i) The AC current density over a 24 hour duration should be lower than 30 A/m² on a 1 cm² coupon.
(ii) Maintaining the average cathodic current density over a 24 hour duration to lower than 1 A/m² on a 1 cm² coupon or probe if AC current density is more than 30 A/m².
(iii) Maintaining the ratio between AC current density and DC current density less than 5 over a period of 24 hours.

In case of AC corrosion risk to the pipeline, Induced AC voltage shall be reduced to such level where AC corrosion densities are reduced to the criteria mentioned above.

Soil resistivity surveys shall be carried out at each HT line crossings, AC interference prone area and pipeline risk assessment for AC corrosion likelihood shall be carried out according to the simulated results, soil resistivity surveys and affected areas shall be marked for the future monitoring approach as per EN 15280:2013.

B. DC Interference-

CP systems of adjacent structures can interfere with the protected structure. DC interference can lead to accelerated corrosion of affected structure.

The CONTRACTOR shall investigate possible sources of detrimental DC stray currents and include proposals in the design on how to mitigate the effect of such stray currents on the protected structure.
CONTRACTOR shall carry out a stray current survey after PCP system commissioning.

Foreign/Owner's pipeline crossing/ HVDC Anode bed/ Running parallel/ PCP ground bed near to the pipeline-

A positive or negative potential swing of 50 mill volts and above on the pipeline under this contract shall be considered as sufficient to indicate the presence of an interaction situation (i.e. Interference on the pipeline) requiring investigation and incorporation of mitigation measures by the BIDDER.

10.3 **Monitoring and Control Signal For SCADA**

Digital and analogue signals as required for monitoring of CP system shall be provided in CPTR Unit for connection to SCADA system.

CPTR unit shall be properly interfaced with SCADA RTU through Hardwired link for various analogue and digital signals. All digital meters (Input voltage and current, Output Voltage and Current, PSP) shall have RS-485 port for serial communication and all meters shall be pre-wired serially and common RS-485 port shall be provided at CP unit terminal block.

Details of SCADA monitoring signals are given below-

Sl No.	DESCRIPTION	MONITERING/ CONTROL	ANALOUGE /DIGITAL	
1	CP TR/CPPSM OUT PUT VOLTAGE	M	AI (4-20mA)	
2	CP TR/CPPSM OUT PUT CURRENT	M	AI (4-20mA)	
3	PIPELINE OVER PROTECTED	M	DI	
4	PIPELINE UNDER PROTECTED	M	DI	
5	PIPE TO SOIL POTENTIAL	M	AI (4-20mA)	
6	PIPE TO SOIL POTENTIAL OF UNPROTECTED SIDE OF THE PIPELINE	M	AI (4-20mA)	
7	ALL REFERENCE CELLS FAILED	M	DI	
8	REFERENCE 1, 2, 3 FAIL INCLUDING REF CELL ON UNPROTECTED SIDE (IJ) FAIL.	M	DI (4 nos.)	
9	UNIT WORKING IN AUTO REF MODE	M	DI	
10	UNIT WORKING IN MANUAL MODEMODE	M	DI	

11	AC INPUT FAIL	M	DI	
12	Battey Low	M	DI	For CPPSM Only
13	CURRENT INTERRUPTER START	C	DO	
14	CURRENT INTERRUPTER STOP	C	DO	
15	CURRENT INTERRUPTER RESET	C	DO	

AI- Analogue input to SCADA/RTU
DI-Digital input to SCADA/RTU
DO- Digital input from SCADA/RTU
Two nos. of spare AI convertors and DI to be connected from CPTRU to SCADA shall be supplied (included in base cost) for future use.

1 AI: Analogue monitoring signal from Equipment to PLC/Telemetry interface cabinet (TIC)
2 DI: Digital Monitoring signal from Equipment to PLC/(TIC)
3 M-Monitoring signal
4 C-Control signal
5 For any control signal the signal shall be available from SCADA for less than 2 seconds only.
6 The rating of the potential free contact for digital input and output signals from Equipment/ PLC/ RTU shall be 24 V DC, 1.5 A DC. Analogue signals shall be 4-20 mA, galvanically isolated.
Provision for minimum two nos analogue and two nos of digital input signal to SCADA System shall be available for future use, from CPTRU to SCADA. pre-installed AI converter, Digital relays for future use.

Control signal shall be provided only for remote operation of the current interrupter.

11.0 CP CABLES

TCP Cables

TCP Cables shall be annealed high conductivity, tinned, stranded copper conductor, XLPE insulated 650/1100 V grade, armoured/un-armoured, PVC sheathed. The size of the copper conductor shall be 6 sq mm for anode cable from anode to buried junction box, 10 sq mm from junction box to test station, 10mm² from test station to pipeline. The size of the conductor shall be 6 sq mm for potential measurement, 10 sqmm for current measurement and 25mm² for bonding, polarization cell / grounding cell/Earthing and surge diverter connection purpose. The anode cable from anode to junction box (buried) shall be unarmoured. The length of anode tail cable shall be sufficient enough to reach junction box (buried) in case of temporary CP anodes and up to test station in case of permanent CP sacrificial anodes.

PCP Cables

i) MMO Anode tail/lead cable (Size 1Cx10 Sqmm)-

Anode tail/lead cable shall be 1Cx10 Sqmm size, annealed high conductivity tinned stranded

copper conductor (7 Strands), PVDF insulated (Thickness 0.040 Inch), HMWPE sheathed/Jacket (Thickness 0.065 Inch), un-armoured.

ii) Anode & Cathode Header Cable- (Size 1Cx35 Sqmm)-

Anode & Cathode Header Cable shall be 1Cx35 Sqmm size, annealed high conductivity tinned stranded copper conductor, XLPE insulated, PVC sheathed, FRLS, 1.1kV Grade armoured cable as per IS: 7098.

iii) TR/CPPSM Input Power Supply Cable - (Size 3Cx10 Sqmm)-

TR/CPPSM Input Power Supply Cable shall be 3Cx10 Sqmm size, annealed high conductivity tinned stranded copper conductor, XLPE insulated, PVC sheathed, FRLS, 1.1kV Grade armoured cable as per IS: 7098 for Single Phase TR Units and 4 core type for 3 phase TR units.

iv) Measurement cable & Permanent Reference cell tail cable- (Size 1Cx6 Sqmm)-

Measurement cable & Permanent Ref cell tail cable from Pipe/Tank/Bullet/Vessel to CJB& CJB to TR/CPPSM Unit shall be 1Cx6 Sqmm size, annealed high conductivity tinned stranded copper conductor, XLPE insulated, PVC sheathed, FRLS, 1.1kV Grade armoured, screened cable as per IS: 7098 or Multi-core signal cable of suitable pair shall be considered for the measurement cable & reference cell cable from CJB to TR unit. (For this bidder may consider 8/12 pair, Multi-core, FRLS, 2.5 Sqmm, 8/12 pair, twisted pair, shielded, armoured, signal cables as per IS/BS).

v) The colour of outer sheath of the cables shall be as per the PJS/Scope of work/Design Basis and outer sheath should have marking of **"CP system Cable"** in each one-meter interval by black colour for identification purpose.

vi) The cables for connecting various transducers from TR unit/ CPPSM to telemetry interface junction box shall be twisted pair with individual pair shielded and overall shielded with aluminum backed by mylar/polyster tape, PVC sheathed, armoured, PVC over all sheathed type.

CABLING SYSTEM

Cable laying philosophy

A. Paved area:	Cable tray/RCC trench/ Above ground cable trays (on sleeper / overhead rack)
B. Process area:	Above ground cable tray (on sleeper / overhead rack) / directly buried / RCC trench
C. Unpaved area:	Directly buried with sand cushioning and brick covered, warning tape and cable marker.
D. Type of cable trays:	Galvanized prefabricated

E. Road crossing for underground cables: HDPE Pipes / GI Pipes

12.0 STATUTORY APPROVAL [R-B]

The submission of application on behalf of the Owner to Govt. Authority/ Central Electricity Authority/ Utilities (water, gas, electricity), if required along with copies of required certificates

complete in all respects, shall be done by the contractor well ahead of time so that project progress is not delayed, these approvals are required from above authorities for data collection for interference survey, bonding of foreign pipelines, interference study, crossings etc. The actual inspection of work by the by above authorities shall be arranged by the Contractor and necessary coordination and liaison work in this respect shall be the responsibility of the contractor. However, any fee paid to these authorities in this regard shall be reimbursed by the Owner on submission of bills with documentary evidence.

13.0 DRWINGS AND DESIGN DOCUMENTS

13.1 The following documents shall be submitted along with the offer:

a) Filled up data sheet/Checklist.
b) HSE Policy
c) Bar Charts & Project completion schedule
d) QAP
e) Approx. dimensions of the system
f) Catalogues for CP units, MMO & Sacrificial Anodes, SSD (Solid state decouplers), spark gap arrestors, ER Probe, reference cells etc.

13.2 The following drawings (in three sets) & documents shall be submitted for approval within 3 weeks of award of contract.

a) Various Procedures of CP system Installation Like- Soil survey (TCP & PCP), Thermit weld, Pin Brazing, Sacrificial anode (Zn/Mg/Ribbon) installations, Test stations & Junction Boxes installation, Cable laying, Installation of SSDs, External ER probe, Surge diverter & grounding cell, connection & sealing of sacrificial anode, Earthing of above ground pipeline, anode ground bed, CP units etc.
b) Soil survey report and chemical analysis report with marked location vulnerable area with all additional data of HT line, foreign pipeline, Cased crossings, river crossings etc as per specification.
c) QA & QC Procedures.
d) List of two years operation and maintenance spare.
e) Basis of system design and design calculations, equipment selection criteria and sizing calculations, formulae used
f) Detailed design calculations of TCP & PCP system (Complete Design Package).
g) Equipment layout, Cable layout & schedule.
h) Colour code identification for the various CP System cables used in the system
i) Procedures for Various Post commissioning surveys (CPL, CAT, CAT Frame 'A' DCVG, Person survey& coating conductance etc as per OISD requirements).
j) Procedure for AC & DC interference detection & mitigation.
k) Procedure for field testing, pre-commissioning & commissioning of TCP & PCP.
l) Procedure for Monitoring & maintenance of CP system.
m) Detailed design of Anode ground bed, typical lay out drawings for Anode bed connection & installation for CP system.
n) Equipment layout, Cable layout & schedule.
o) TLP's & junction boxes installation & erection details drawings.
p) Incorporation of Anode bed, Polarization cell, surge arrester, TLP, Junction boxes & other relevant feature in CP system design in Alignment sheet, pipeline route diagram & Plot plan.
q) G.A. of TR/CPPSM unit.
r) Schematic

s) Wiring diagram for reference.
t) Tentative Bill of Material

13.3 After the job completion, contractor shall prepare AS-BUILT drawings/data sheets and documents, submit catalogues/manuals (O&M) of major brought out items. Final certified as built drawings, documents and manuals etc shall be submitted by the contractor to owner in bound volume with one set in soft copy (CD) plus five sets of prints to owner & one set to MECON.

Other drawings and documents shall be submitted by contractor along with AS-BUILT Drawings/Datasheets-

a) Test documents & drawings for bought out items.
b) Soft/Native files of interference studies shall be provided in pen- drive.
c) Detailed commissioning report of pipeline CP system (Both TCP and PCP).
d) AC & DC interference simulation report along with the mitigation report.

-x-x-x-

APPENDIX – 1

LIST OF ABBREVIATIONS

1) **AC –**Alternating current
2) **CAT –**Current attenuation test
3) **CJB –** Cathode Junction Box
4) **CP-**Cathodic Protection
5) **CPPSM-**Cathodic Protection Power Supply Module
6) **DCVG –**Direct Current Voltage Gradient
7) **DC –**Direct Current
8) **FRLS-**Fire Retardant Low Smoke
9) **GSM –**Global System for Mobile
10) **HMWPE –**High Molecular Weight Polyethylene
11) **MMO–**Mixed Metal Oxide
12) **NACE-**National Association of Corrosion Engineers
13) **PCP–**Permanent Cathodic Protection
14) **PVC –**Polyvinyl Chloride
15) **PVDF–**Polyvinylidene Difluoride
16) **ROU –** Right Of Use
17) **RTU –** Remote Terminal Unit
18) **TCP–**Temporary Cathodic Protection
19) **TR-** Transformer Rectifier
20) **XLPE-** Cross Linked Poly Ethylene

SCOPE OF WORKS
FOR
CATHODIC PROTECTION WORK

INDRADHANUSH GAS GRID LIMITED

DULIAJAN FEEDER LINE (FROM CGGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)

MECON LIMITED DELHI
(ELECTRICAL SECTION)

Document No.	Revision No.	Date
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1.0 GENERAL

1.1 Introduction

Special Condition of Contract shall be read in Conjunction with the General Conditions of Contract, specification of work, Drawing and any other documents forming part of this contract wherever the context so requires.

Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

Where any portion of the General Condition of Contract is repugnant, to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears, the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Condition of Contract and shall to the extent of such repugnancy, or variations, prevail.

The materials, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the TECHNICAL SPECIFICATIONS contained herein and CODES referred to. Where the technical specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain work or provide certain facilities, it is understood that the CONTRACTOR shall do so at his cost and the VALUE OF CONTRACT shall be deemed to have included cost of such performance and provisions, so mentioned.

It will be Contractor's responsibility to bring to the notice any irreconcilable conflict in the contract documents at the time of bidding during pre-bid stage. After award of contract, the stringent of available technical/statutory/specifications/drawings shall be implemented at the no additional cost to Owner.

In the absence of any specifications covering any material, design of work(s) the same shall be performed/ supplied/ executed in accordance with Standard Engineering Practice as per the instructions/ directions of the Engineer-in-charge, which will be binding on the Contractor at no additional cost and time to Owner.

2.0 PROJECT DESCRIPTION

Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, GAIL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. As per Hydrocarbon Vision 2030 for North East India, North East Gas Grid (NEGG), a natural gas pipeline network, is being set up to connect the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni Guwahati Gas Pipeline. The project is being implemented in three phases based on the requirement of statutory clearance, route terrain, linkage with Highway corridor widening works, difficulty in work execution etc. for the development of a gas-based economy in North-Eastern India.

As per the mandate of the Cabinet Committee on Economic Affairs (CCEA), the NEGG is to

connect all the eight Northeastern states to the National Gas Grid for the development of a gas-based economy in the Northeast in line with the Hydrocarbon Vision 2030 for the Northeast. It is also mandated by the CCEA to connect all the regional gas sources of the Northeast for early monetization of natural resources and to boost Exploration & production (E&P) activities in the region.

The natural gas pipeline grid would have the facility for injection of indigenously produced gases also. Connectivity from local marginal fields as well as source line/spur lines into North-East Gas Grid has been considered. The upstream source/ pipeline operator would make necessary arrangements for availability of requisite pressure at source for gas injection into the grid, as per the hydraulics.

M/s IGGL has awarded M/s MECON Limited as project management consultancy (PMC) services for proposed 24″NB X 176.120 Kms. (appx.) cross-country pipeline from Dispatch Terminal at CGGS Madhuban of OIL to existing SV-14 of GNPL at Jorhat-IGGL connectivity along with associated facilities. The Scope also includes a proposed 24″NB X 6.100 Kms. (appx.) cross-country pipeline from Dispatch facility at BCPL Lepetkata Plant to receiving (cum injection point) at Jokai Lepetkata along with associated facilities. The total proposed pipeline length is 24″ NB × 182.220 km (appx.). (Refer attached Schematic drawing) Salient features of the Project are as below:

Product: NG
Pipeline Size: 24”/6”
Pipeline Coating -3LPE
Refer table-1 for details of pipeline under this package.

In case of any conflict between the design basis &codes/ standards listed, the same shall be brought to the notice of Owner/Consultant for final decision, stringent of the same shall be followed without any additional time and cost to IGGL.

Salient features of the project are as below:

Originating Point : DT Duliajan

End Terminal : SV-14 GNPL

SVs/ IPs : 9 SVs/ 1 IP.

Product : Natural Gas

This document presents scope of work for TCP & PCP system for 3LPE Coated pipeline against corrosion for a service life of 30 years. It indicates minimum requirements for detailed design of CP system and equipment.

2.1 PROJECT DETAIL

Details of Proposed Mainline-

Pipeline	Location		Diameter/ Thickness	Approx. Length (Km)
	From	To		
DULIAJAN FEEDER LINE	Dispatch Terminal at CGGS Madhuban	SV-14 of GNPL	**24"**	**176.120 Kms (Approx.)**
Connectivity line	Dispatch facility at BCPL Lepetkata Plant	receiving (cum injection point) at Jokai Lepetkata	**24"**	**6.100 Kms (Approx.)**

- Material of Construction : Carbon Steel
- Length, in km : ~ As mentioned above
- Pipe Specification : As per P&ID
- Thickness : As per P&ID
- Design pressure : As per P&ID
- Corrosion Allowance : Refer Pipeline design Basis
- External Coating : 3-LPE
- Major Water Crossings : As per Alignment Sheet
- Major Road Crossings : As per Alignment Sheet
- Rail Crossings : As per Alignment Sheet
- HT line crossing : As per Alignment Sheet

3.0 STANDARDS

3.1 The design, selection and installation of equipment and materials shall also conform to the requirements of the relevant latest standards as defined in the design basis cl no.- 3.0 (Codes and Standard)

3.2 The work shall be performed in conformity with this design basis, scope of work, standard specifications enclosed in this tender and code of practices of the Bureau of Indian Standards.

In case of any conflict between the design basis, scope of work & codes/ standards listed, the same shall be brought to the notice of Owner/Consultant for final decision, stringent of the same shall be followed without any additional time and cost to IGGL.

In addition, the work shall also conform to the requirements of the following:

3.3 The Indian Electricity Act, and the rules framed there under.
The regulations laid down by the Chief Electrical Inspector of the state government/ Central Electricity Authority (CEA).
The regulations laid down by the Factory Inspector.

The regulations laid down by the Chief Controller of Explosives.

Any other regulations laid down by the Central, State or Local Authorities from time to time during the execution of this contract.

4.0 GUARANTEE

4.1 The contractor shall guarantee the installation against any defects of workmanship and materials (supplied by the contractor) for a period 12 months from date of commissioning (As

per DLP terms & conditions defined in the Contract volume). Any damage or defects connected with the erection of materials, equipments of fittings supplied by the contractor that may be undiscovered at the time of issue of the completion certificate, or may arise or come to light thereafter, shall be rectified or replaced by the contractor at his own expense as deemed necessary and as per the instruction of the Engineer-in-charge within the time limit specified by Engineer-in-charge.

4.2 The above guarantee shall be applicable for the quality of work executed as well as for the equipment/ cable/ fittings/ other materials etc supplied by the contractor.

Equipments installed or commissioned by others within the battery limit. This is for the purpose of obtaining a comprehensive approval from competent authority.

5.0 SITE CONDITIONS

Classification of hazardous area will be in accordance with BIS and IS: 5572.

Following selection will be considered for proper selection of electrical equipment for use in hazardous area:

a) Area Classification : Zone-1 & Zone 2

b) Gas Group : IIA and IIB

c) Temperature Classification : T3

All electrical equipment installed in hazardous areas will be selected IS 16724/ IEC 60079.

All the electrical equipment for hazardous areas shall be of Ex-d type suitable for temp classification T3 and shall be certified by CMRI or equivalent independent testing agency and shall have valid PESO license.

6.0 Power Supply Parameters for CP units-

CPTR-AC Panel (From UPS/Inverter)	240 V AC ±10%, 1 Phase
CPPSM- Solar system	48 V DC, 2 wire system

7.0 Abbreviations

3LPE	-	Three-layer Poly Ethylene
3LPP	-	Three-layer Poly Propylene
AJB	-	Anode Junction Box
CJB	-	Cathode Junction Box
CPPSM	-	Cathodic protection power supply module
CTSU	-	Computerised Test Station Unit
CAT	-	Current Attenuation Test
DCVG	-	Direct Current Voltage Gradient
DLP	-	Defect liability period.
D/T	-	Despatch Terminal
ER Probe	-	Electrical Resistance Probe
ICCP	-	Impressed Current Cathodic Protection

IP	-	Intermediate Pigging
PCP	-	Permanent Cathodic Protection
PSP	-	Pipe to Soil Potential
R/T	-	Receiving Terminal
SV	-	Sectionalizing Valve
TCP	-	Temporary Cathodic Protection
TR Unit	-	Transformer Rectifier Unit
TLP	-	Test Location Point (Test Station)
QA/QC	-	Quality Assurance & Quality Control
XLPE	-	Cross Link Poly-Ethylene

8.0 ELIGIBILITY CRITERIA FOR CP CONTRACTOR (OTHER THAN LISTED IN VENDOR LIST) AND CO-ORDINATION WITH OTHER CONTRACTORS

The Bidder or the CP Contractor engaged by the Bidder should have completed and successfully commissioned at least one CP (TCP & PCP) system project of any single cross country pipeline project during the last 7 years reckoned from the due date for submission of bids, consisting of corrosion survey, design, detailed engineering, supply, installation, testing & commissioning including the DC interference detection & mitigation and AC high induced voltage detection & mitigation and post commissioning surveys like CIPL, CAT or DCVG of at least one cross country pipeline of minimum 90 Km length and having minimum three (03) nos. of impressed current CP Stations.

Bidder / CP Contractor should have license of software (SES/Elsyca) simulation of AC /DC interference & mitigation or Bidder can propose backup agency for the software simulation of AC /DC interference. Successful Bidder shall submit the PTR (Past track record of the CP Contractor i.e. work orders and completion certificate from end user) for approval before engaging the CP Contractor on job.

Bidder and it's CP contractor shall entirely be responsible for Co-ordination with other contractors & shall mobilize necessary teams in each respective section/part as per the site organisation chart (Annexure-C) enclosed with this tender with the key responsibility, education qualification, designation, experience as defined and shall be responsible for the timely execution of CP work.

If the contractor fails to execute the CP work within tender specified delivery period or fails to mobilize CP teams/material as specified in the tender, necessary price reduction schedules shall be applied as per the contract provisions.

9.0 SCOPE OF DESIGN AND ENGINEERING

The scope of design and engineering shall include preparation and submission for review of CP system design & detailed engineering package, specification for procurement of CP System equipment/ materials, equipment drawing/ document, preparation of site engineering drawings and details for installation work wherever applicable or required by the CLIENT/ Consultant and submit to the CLIENT/ Consultant for approval.

All CP document shall be prepared and vetted by a NACE certified CP level 3 personnel. Installation, testing and commissioning activities shall be performed by a NACE certified CP Level 2 engineer. CV of the personnel shall be submitted by the contractor to the Client/Consultant for review and approval prior to Engineering & Construction activities.

Major documents and activities requiring pre-approval from Client/Consultant shall include but not to limited to the following:

- Methodology of soil resistivity survey, site data collection & soil resistivity report.
- Detail engineering document with equipment selection and sizing calculations, construction drawings with Bill of material (with supplier name)
- Quality Assurance Plan (QAP) for FAT & Inspection Test Plan (ITP).
- Procedure for field-testing, Installations, commissioning and post commissioning surveys with formats for SAT (Site acceptance test).
- Electrical connection schemes, cable schedule, cable layout drawings etc.
- Interference study procedures duly vetted from the NACE –IV certified person.

All design and calculation reports/documents including formulas shall be submitted for review/approval to Client/Consultant in editable & PDF copies.

10.0 SCOPE OF WORK (SUPPLY, INSTALLATION, TESTING & COMMISSIONING)

General

Contractor shall execute TCP work simultaneously in coordination with laying contractor when lowering of the -pipeline is going on. Activities like- Cable to pipe connection, installation of ER probe, Polarisation cell, Polarisation coupon etc should be completed before the backfilling of the trench.

10.1 TEMPORARY CATHODIC PROTECTION SYSTEM

Corrosion survey, design, detail engineering, fabrication, supply, installation, testing and commissioning of the temporary cathodic protection system using Mg/ Zn galvanic anodes to protect the external surface of 3LPE coated pipeline against corrosion for design life of minimum 2 years or till the commissioning of PCP system, whichever is later. The detailed length of pipeline is as under-

Pipeline	Location		Diameter/ Thickness	Approx. Length (Km)
	From	To		
DULIAJAN FEEDER LINE	Dispatch Terminal at CGGS Madhuban	SV-14 of GNPL	**24”**	**176.120 Kms (Approx.)**
Connectivity line	Dispatch facility at BCPL Lepetkata Plant	receiving (cum injection point) at Jokai Lepetkata	**24”**	**6.100 Kms (Approx.)**

Maintaining and keeping of PSP value as specified and monitoring at monthly basis of PSP voltage & AC voltage of the temporary cathodic protection system (As per format Enclosed in Annexure-B) till commissioning of the permanent cathodic protection system. All work shall be carried out conforming to the Scope of work, Design Basis, Data Sheets, national & international standard & as per standard specification No.- MEC/TS/05/E9/016A for temporary cathodic protection system. Scope shall also include but not limited to the following for completion of jobs: -

a) Temporary CP system shall be installed immediately of the any lowered section but not later than

15 days from the time of lowering of pipeline segments. If TCP system is not provided for any of the lowered section in the specified time, necessary deduction shall be carried out from the contractor's head as non-compliance of work. The deduction shall be 1000 rs per day per lowered section in each spread, example_ 1000x nos of days TCP unprotected x lowered sections.

b) Measurement of soil resistivity along the right of way of the main pipeline (At 500mtr Interval) & collection of soil & water samples along ROW at depth of 1M, 2M & 3M at every 10km interval (Min 03 sample at each location) for its chemical & microbial analysis along the pipeline route as per specification for corrosion survey **MEC/TS/05/21/016C & NACE Standard TM0106-2006 for** detection of SRB, ARB, TDS, pH, Rx, Moisture & Total dissolved H_2S etc. These sampled shall be stored in sealed container and stored in the dark place. At location of HVAC crossings/ parallelism, soil resistivity should be measured up to the depth of 100 m at recommended pin spacing's of 0.1, 0.5, 1, 2, 5, 10, 20, 30, 50,100m.

c) Collection of additional data related to cathodic protection along the right of way of pipeline as per standard specifications during the survey along with GPS coordinates. Site survey report shall include detailed layout drawings of pipeline / facilities, reflecting all foreign pipeline / Overhead power transmission lines crossings & parallelism, Power cables, river, railway traction (electrified/non-electrified), Substations (HVAC/HVDC), fabrication yard, existing CP facilities (such as transformer rectifiers, anode ground beds, test facilities etc.), soil resistivity survey locations, road crossing locations, etc. Site survey includes details of all AC, DC interfering elements all along pipeline ROW.

Site survey shall be carried out along the pipeline route to identify the HVAC crossing locations and/or HVAC line parallelisms. Site survey report shall include a comprehensive list which includes the HVAC line rating in KV, distance of HVAC line / tower footings from pipelines and length of parallelism. Survey shall also include AC potential measurements of existing pipelines in the same corridor.

d) Design, Detailed Engineering, Preparation of Design Document, Preparation of Test station schedule & Bill of Material as per the corrosion survey & Chemical analysis of Soil / Water samples for Temporary Cathodic Protection system.

Design life of TCP system- 2 Year or till commissioning of PCP whichever is later. In case of commissioning of PCP is delayed, Pipeline contractor shall ensure that pipeline is fully protected by installing additional anodes for extending the life.

e) Total number of anode shall be calculated as per total anode weight requirement & total protection current required.

f) Supply, Installation, Testing & commissioning of Test stations (Big Size & Normal Size) weather proof (IP-55) as per specification & enclosed drawings. Selection of TLP size will be as per the nos. of cables terminating at the station. TLP shall be sealed at both ends by means of foam sealing/solid sealing. Termination plate inside the TLP should have high insulation level (FRP or higher grade) to avoid drainage of CP current due to insulation leakage.

All the test-stations and junction boxes shall be provided with shrouded allen screws to avoid vandalism.

Current measurement test station-Every 5 KM.

TLP installed in the stations shall be FLP type and PESO approved if the installation in Zone 2 in the station (for safe area IP-55 TLP are acceptable).

Note-1-Cable coming from 60 Mtr for Current measurement test stations (Type_B) & cables for foreign pipeline crossing shall be provided with black sleeves for the identification purpose.

g) Supply, installation, testing & commissioning of Mg (Min 5.0 Kg)/ Zn Galvanic anodes/ Mg ribbon anodes with backfill as per the standard specification- **MEC/TS/05/E9/016A**. The weight of the Mg Anode & the total nos. of anodes shall be calculated as per the corrosion survey, soil chemical analysis, total weight and current requirement of the pipeline section. **However, Min one anode is to be installed at every one KM with test station.**

h) **Supply, installation, testing and commissioning of 10kg Mg anodes at both side of River crossings/ HDD, and Road/ Railway/ Nallah crossing (for casing pipe).**

i) Cable to pipe connection by thermit welding/Pin brazing (for charged pipeline) for 35, 25, 10, 6 sq.mm copper cable including excavation and exposing piping, recoating with epoxy, testing etc.

j) **Supply, laying of HDPE sheets (1200mm wide, 6mm thick) between the IGGL pipeline and the other CP protected foreign pipelines at the crossing locations for providing electrical isolation and discharge of the CP System current between the pipelines.**

k) Earthing of above ground catholically unprotected pipeline at consumer station/DRS station/Metering skid etc, the earth electrode shall be 65 mm dia, 4.5 mm thickness & 3000mm long. Total grounding resistance shall be limited to 2 Ohm max.

l) Earthing of MOV's at DS/RS/SV stations shall be carried out by SSD (Solid state de-coupler/Polarisation cell) Zn anodes with min installation of 02 nos. Of electrode or by Zn ribbon anodes. Station earthing shall be utilized for the grounding.

Armour of cables of MOVs installed on the cross country portion shall be disconnected at MOV end so that it will not allow CP current to drain.

m) Supply, installation, testing & commissioning of one set of Explosion proof type spark gap arrestor (100 kA@ 10/350 uS rating for lighting protection and 8/20 uS 100kA for surge protection) across each insulating joint provided at dispatch terminal, receiving terminal, tap-off, SV & various consumer terminals as per P&ID / specification.

All the monolithic insulating joints (MIJs) on the main line, on the tapings for the instruments viz. pressure transmitter, densitometers etc. shall be provided with explosion proof surge divertors.

Note- 2-Surge diverter cable needs to be terminated without any joints across the IJ. Surge diverter with its pre-wired connecting cables with suitable length & size should be provided and installed at the Isolating joint.

n) **CP AT CASED CROSSINGS**

i) Casing should be avoided as far as possible. If cased crossing is unavoidable, Bare casing is always recommended with selecting higher thickness allowance as per API 1102.
ii) No sacrificial anodes (ribbon anodes) shall be used inside casing & carrier annular space.
iii) No Casing filler between annular space of casing and carrier.

o) **Solid state de-coupler with grounding at HT line crossings/ railway tractions/ for interference mitigation-**

Crossings of HT line crossings/ railway tractions/ HVAC cables for interference mitigation- -

Supply, installation, testing & commissioning one set of polarization cell (Solid state DC - De coupler) with zinc anode at, all railway tractions (electrified)/ HVAC cables (33kV & above)/ igh tension electrical power transmission line/equipments (all 66 KV & above) crossing or running parallel to the pipeline for grounding purpose as per specification/design basis for existing & proposed high tension electrical power transmission lines. The rating of the cell shall depend upon anticipated fault current & ground bed resistance at the location of installation and the calculation of the same shall be furnished to MECON for review & selection of rating of the Polarization Cell.However, the rating of polarization cell shall not be less than 3.7 KA @ 30 Cycle & number of 20 kg net weight zinc anode shall not be less than two. If required, Zn Ribbon anode (Dia min. 12x14 mm with back fill in trench)/ pre-packed AC mitigator wire of MATCOR/Equivalent make may also be used for the grounding purpose to get lower grounding resistance (for soil resistivity higher than 25 Ohm-Cm) as per the direction of engineer in-charge. The resistance of grounding shall be limited to 1 ohms max.

Running parallel of HT line crossings/ railway tractions/ HVAC cables for interference mitigation-

Grounding shall be done at regular intervals of maximum 1 km where transmission lines run parallel within 1km of the pipeline and have separation distance of 100 mtr on both side of the pipeline.

If any proposed additional line of voltage rating 66kV & above is envisaged during construction, the same shall also be considered in the design document. Contractor shall supply polarization cell along with necessary grounding system for the same. If it is observed during the monthly monitoring that the source of the AC interference is due to the HT lines less than 66kV or LT line, Contractor shall provide the grounding the pipeline through SSD to lower impact of the AC interference on the pipeline.

Note-1 Bidder to note that HT line (>11KV) which is crossing the HDD section of the pipeline (executed by other contractors), supply, installation, testing and commissioning of the SSD with grounding anodes is in the scope of contractor to achieve the lower AC PSP.

Note-2 If it is observed during the monthly monitoring that the source of the AC interference is due to the HT lines less than 66kV or LT line or pole mounted substations etc, Contractor shall provide the grounding the pipeline through SSD to lower impact of the AC interference on the pipeline to achieve the lower AC PSP.

Note-3 In case of AC PSP of more than 15 V is observed at IJ location on protected side of the pipeline, Pipeline shall be grounded though the solid state de-coupler with Zn anodes.

p) Supply, installation, testing & commissioning of external electrical resistance Probe (02 nos.) with one (01) number reading instrument, utilizing the electrical resistance technique shall be provided along the pipeline at marshy / vulnerable locations to monitor the external corrosion activity on the pipeline. Location of external ER probe shall be decided during detail engineering.

Care shall be taken during installation of ER probes so that probe element is opposite to pipe (Not

facing the pipeline).

Location of Probe- To be decided by CP contractor during detail engineering based on specifications and in consultation with the Owner/Consultant

Supply, installation, testing & commissioning of Polarisation coupons (Min. 1 no. at every 5km interval along pipeline ROW) each of total area of 100mm x 100mm (min.) having one side exposed area of 10cm2, without permanent reference cell, shall be provided along the pipeline and at additional vulnerable locations (both side of HDD crossings, In between parallel pipelines at every km,River crossings, Marshy locations, Interference prone area, stray current source locations, foreign pipeline crossings/parallel (at every KM in case of parallel), at CP stations) to monitor the external corrosion activity on the pipeline as per enclosed standard specification. Location of external Polarisation coupons & Number of magnetic devices for operation of magnetic switch shall be decided during detail engineering in consultation with IGGL/MECON.

Care shall be taken during installation of polarization coupon that bare face of polarisation coupon is opposite to pipe & polarisation coupon shall not be installed between TLP & Pipeline.

The works related to collection of approximately 2-5 m of pipeline material (In pieces of 300 to 1000mm length) for fabrication of Polarisation coupons is in the scope of the contractor and the required pipeline material shall be supplied by the Owner.

q) **Bonding of pipelines running parallel in common ROU/ Crossing -**

Bonding in between pipelines running parallel or crossing as required including taking of permission from the owner of the foreign pipeline (Permission shall taken by the Pipeline Owner and any fee required for the same shall be paid by the Owner, however contractor shall assist in all respect to get such permissions from foreign pipeline owner).

i) Bonding of pipelines shall be carried out through bonding stations (variable resistance of suitable value + shunt + diode, if required). Polarization coupons shall be installed at every test station in the parallel section and at crossings.

ii) The Contractor shall supply and install bonding stations as provision to bond the pipelines. For the new pipeline as a provision for interference mitigation Bonding Junction box (BJB) shall be installed as a minimum at the following locations-

iii) Where the new pipeline runs parallel to the existing pipelines, at start and end of parallelism and at every five (5) km intervals. As a minimum, all existing parallel pipelines laid with a separation distance of 10 m shall be provided with bonding provision.

iv) Where the pipeline crosses or intersects the existing buried pipelines or buried section of pipelines / Piping.

v) BJB shall have provision to terminate 25/35 mm2 bonding cables and a 6 mm2 potential monitoring cables connected to each foreign pipelines as well as new pipelines. BJB shall be provided with appropriately rated shunts and resistors for each circuit. Rating of the resistors shall be calculated based on the mitigation requirement.

r) Supplying, laying, termination, Glanding, ferruling & testing of all the cables of TCP system, Cu-Conductor, XLPE insulated, PVC sheathed, Armd/Unrmd (1Cx6 mm2, 1Cx10 mm2, 1Cx25 mm2,

1Cx35mm2) as required.

s) Calibration factor of similar thickness pipeline section shall be carried out by the Bidder at each B Type test stations by arranging separate power source. Bidder shall refer pipe book for the same.

t) PSP Monitoring on monthly basis of the TCP system till commissioning of the permanent cathodic protection system including the coupon OFF PSP.

All civil/ structural works related to TCP system including supply of bricks, cement & steel etc. required for completion of the system with other miscellaneous works specified in scope of work.

u) Coating Integrity test of HDD section (for all HDD sections) of the pipeline shall be conducted immediately after the completion of the HDD of each HDD section by separate temporary power source and anode bed. Bidder shall submit the procedure as per the ISO/ NACE requirements (NACE TM 102:2023) for approval along with the design document. Criteria for the current density for the HDD section is defined in the design basis, accordingly CIT test shall be carried out before tie-in of HDD section with mainline.

Notes for TCP-

Note-3 Additional protection of carrier pipe (By Zn ribbon anodes) inside the bare casing is not required.

Note-4 5 kg Mg anodes shall be provided for protection of Casing pipe (external side) wherever required.

Note-5 Connection scheme of CP system in TLP boxes shall be permanently fixed inside the test station box (TLP Box).

Note-6 At saline soil Ag/Agcl Permanent Reference electrode shall be used.

Note-7 Vendor list of Make of CP Materials is enclosed with the tender as appendix-I all CP material shall be as per the make mentioned in the vendor list.

Note-8 For chainages refer Pipeline Schematic Route Diagram

Note-9 Localized soil resistivity at 1.5Mtr depth shall be considered for calculation of number of Anodes.

10.2 PERMANENT CATHODIC PROTECTION SYSTEM

General

Contractor shall execute PCP work simultaneously in coordination with other contractor when Lowering, Electrical & Civil of the -pipeline is going on. Activities like- AGB land acquisition, Cable to pipe connection, installation of ER probe, Polarisation cell, Polarisation coupon etc shall be coordinated with other contractors.

Execution Methodology

Successful bidder shall start acquisition of land for AGB immediately & execute interference study

work (site data collection and software modelling) simultaneously with TCP work after award of the contract and all other post commissioning activities shall be commenced after completion of the Interfere study work and PCP supply, installation, testing and commissioning work.

Training

Successful bidder will provide classroom training as well as field training to the Owner's personnel for at least of 2 Man days for TCP, PCP & Interference detection and Mitigation (1 day classroom and 1 day field). The training will broadly consist of system basics, installation, operation & function of CP system and interference detection & mitigation and post commissioning surveys its data analysis & assessment and experience sharing etc The trainer will have vast experience in cathodic protection field and corrosion data analysis and have NACE-IV certification.

7.0 CP SYSTEM DESIGN FOR PARALLEL PIPELINE IN COMMON ROU

Operation philosophy for combined CP System of existing CP protected pipeline and new proposed 24" line in common ROU:

Operation philosophy for combined CP System of existing pipelines line and new 24" line:

Common CP unit shall be considered for CP System of both the existing & 24" line and new 24" line. New anode ground beds shall be installed at all SV station of 24" pipeline.

11 nos. CP Stations shall be operating with the ground bed of existing pipelines combined and sharing the requirement of the both pipelines in common ROU. Positive header cable from the AJB of new anode ground bed shall be terminated to the Positive terminal of CPPSM/CPTR where existing anode ground bed is already connected to pipeline with existing CP Stations,

Anode beds of both pipeline new and existing shall work in parallel.

(A separate junction box i.e. bond junction box shall be provided to control the current of 02 AGB with shunt and resistance, if required)

Similarly, Negative header cable from the CJBs of the pipeline in common ROU & new 24" line shall be connected to the common Negative terminal of CPPSM/CPTR at all the 11 number CP Stations (new) and also at the CP station of the existing pipelines in common ROU, so that separate drainage connections are made to each pipeline from the common CPPSM/CPTR at each CP station. A new junction box in negative header shall be installed at all locations of CP station for current drainage and control and have provision to control the CP current with shunts and resistors.

In addition to the separate drainage connections at each CP Station stated above, direct/resistance bonding connections shall also be made between the two pipelines at the test stations along the pipeline route at additional locations where ever required to minimise interference between the two lines at every 01 KM.

Out of the existing three permanent reference cell connections at CPPSM/CPTR from the existing line at each CP Station, one permanent reference cell connection shall be removed and shall be replaced by one permanent reference cell connection from the new 24" line, so that each common CPPSM/CPTR at each CP Station can get feedback from both existing & new pipeline in common ROU to control of CP System current.

Operating current of each CP Stations shall be shared by each pipeline in common according to their coating conductance.

Due to such current sharing the PSP level of any one of the pipelines may become higher than the other. To minimize this PSP level difference between pipelines in common ROU, the max current limit settings and the target PSP settings at each CPPSM/CPTR at each CP Station need to be adjusted in such a manner so that entire length of both the pipeline is adequately protected without overprotecting any one of the pipelines.

Pre design survey for PCP design in common ROU-

1. Existing pipeline protection current requirements (Protective Current density) with current working state.
2. Coating conductance at B type stations on existing pipeline.
3. Review of all previous CP & Coating integrity survey reports- CIPS, CAT, DCVG/ ACVG, coating conductance surveys, ECDA reports.

Bidder will design CP system for the pipelines in common ROU considering the above provisions along with discussion with the operator of the existing pipelines during the details engineering & prepare the combined operational schemes for the pipelines in common ROU and shall be discussed with the operation for any modifications, accordingly bidder will suggest the CP current requirement for the new pipelines and old pipeline in common ROU with the adjustment with the current is complete when both pipelines simultaneously achieve a stable, polarized "Instant-Off" potential between **-850 mV and -1200 mV**.

PCP system data operational data of existing pipelines in common ROU are attached with following link.

https://drive.google.com/file/d/1LRhjDaYrOpcAYmN_G18wUEamHN2DsfLQ/view?usp=sharing

10.3 Permanent Cathodic Protection System

Survey, Design, Detailed Engineering, Manufacturing, Inspection/FAT (Factory acceptance test), Supply, packing, transportation to site, installation, testing and commissioning of the permanent cathodic protection system by impressed current method using MMO coated Titanium anodes to protect the external surface of 3LPE Coated pipeline against corrosion for a service life of 30 years, as per Standard Specification No. MEC/TS/05/21/016B for Permanent Cathodic Protection system. The detailed length of pipeline is as under-

Pipeline	Location		Diameter/ Thickness	Approx. Length (Km)
	From	To		
DULIAJAN FEEDER LINE	Dispatch Terminal at CGGS Madhuban	SV-14 of GNPL	**24”**	**176.120 Kms (Approx.)**
Connectivity line	Dispatch facility at BCPL Lepetkata Plant	receiving (cum injection point) at Jokai Lepetkata	**24”**	**6.100 Kms (Approx.)**

The scope shall include complete Permanent Cathodic Protection system, including carrying out

the soil resistivity measurement for anode ground beds, design of anode ground beds considering size / rating of anode bed not less than the minimum requirements of the anode ground bed specified, AC/DC Interference detection and mitigation, AC/DC interference on pipeline and CP System due to proximity of foreign AC/DC source, detection and mitigation of high induced voltage at pipeline due to proximity of HT lines, substations etc, close interval potential logging survey for entire length of 16" dia pipelines and additional surveys (as per OISD and PNGRB)i.e. CAT survey (Full length), CAT with frame 'A' /DCVG etc at selected locations which shall be decided from the abnormal areas of close interval potential logging survey results & CAT survey result to identify coating defects/holiday, conducting pipeline line current & coating resistance test at selected locations where current measurement test stations installed, preparation of commissioning report and as built drawings etc. All work shall be carried out conforming to the Scope of work, Design Basis, Data Sheets, standard specifications enclosed with this tender & other standard as applicable.

Scope shall also include disconnection of TCP system which does not form part of PCP system. Equipments coming under TCP system if useful & required in PCP system shall be used effectively in designing of PCP system. If any inadequacy reported in the equipment at the time of commissioning of PCP, in such case all work associated with supply, installation, testing and commissioning shall be in scope of CP contractor with no extra cost.

The Scope shall also include but not limited to the following for completion of jobs:-

a) Selection of plot for deep well/shallow anode ground bed at CP station at following proposed locations of CP stations given below (Min. three plots nearby each location shall be selected for the survey out of which the most favourable plot shall be considered for installation of anode ground bed).

i- DT- Madhuban, Ch 00.00 Km
ii- SV-01, Ch. 16.00 km
iii- SV-02, Ch. 32.50 km
iv- SV-03, Ch. 48.00 km
v- SV-04, Ch. 64.00 km
vi- SV-05 Ch. 80.00 km
vii- IP-01 Ch. 96.00 km
viii- SV-06 Ch. 112.0 km
ix- SV-07 Ch. 128 km
x- SV-08 Ch. 144 km
xi- SV-09 Ch. 160 km

Note : Above mentioned locations are tentative & indicative only, same may change during detail engineering as per approved Design package.

The above selected plot for the anode ground bed will be truly remote with respect to the proposed pipeline's & other nearby foreign structure/pipeline. For calculating the remoteness of the groundbed from cathodically protected pipeline and nearby foreign structure/pipeline location (NACE latest recommendation shall be utilized & remoteness from both cathodically protected pipeline & nearby foreign structure/pipeline shall be calculated). However the distance of anode bed from cathodically protected pipeline and other nearby foreign structure/pipeline shall not be less that as calculated in remoteness calculations.

M/s IGGL shall provide the land for the installation of deepwell type anode bed in the plot, if land in surrounding the station is not available & remoteness length is meet, accordingly the successful

bidder shall pass the financial benefit of the same to M/s IGGL. Bidder shall design PCP system considering higher depth to achieve the remoteness in this case.

Proposed location of CP stations/Anode- To be decided by Contractor. (However tentative location of CP station are mentioned in the Scope of Work, Exact location shall be decided in detail engineering & approval of design document in consultation with Owner/Consultant).

b) Carrying out the soil resistivity survey for design of anode ground bed at the selected CP station locations. (Min. at three locations shall be selected for the soil resistivity survey & necessary data shall be collected to determine the most suitable anode bed location) as per specification for corrosion survey **MEC/TS/05/21/016C**.

c) Preparation & submission of design document as per the results of surveys, specification & data sheet for procurement of CP System equipment/materials, drawing/document to the Engineer-in charge for review & approval, preparation of site engineering & installation drawings for installation work wherever applicable or required by the Engineer-in-charge, and submit the same for approval and comments. All documents of PCP system including survey, Design, review of collected survey data, installation procedures, post commissioning surveys and complete PCP system of pipeline shall be designed & signed by NACE certified CP specialist having valid CP specialist certificate.

Overlapping in protection -Shall be provided (If one CP station failed, another near station/s will take care the CP protection & none of pipeline part shall be left unprotected)

d) Acquisition of land or Lease (for 99 years/as per statuary regulations) for Anode bed, Anode junction boxes and anode ground bed ROU for cable laying (Title transfer in the name of the Owner. (Land size Min 46mx3m for shallow and Min. 5mx5m, for deep well type), ROU for laying of cables (1mtr wide) from AJB to CPTR. Transferring the title of the acquired land in favour of IGGL at the CP station locations.

Preferably, anode ground bed should be located within IGGL's station boundary if electrical remoteness is achieved, otherwise separate land shall be procured during project stage for installation of anode ground bed.

Scope includes acquiring land and Change of land ownership to the name of IGGL including NA (Non-Agricultural) conversion (where required), area grading / levelling to a suitable grade level to avoid water logging, supply and fixing of chain-link fencing and gate. The item scope also includes acquiring ROU (where required) for cable laying between CP Unit and Anode bed and Transferring the title of the acquired land in favour of IGGL at the following CP station locations including change in title in revenue records at following locations.

Note-10- Land for anode bed for the complete Pipeline is in the scope of Bidder.

The Bidder scope of job includes, but is not limited to, the following:

a) Identification of plot in close vicinity to the chainages of the respective Sectionalising Valve Stations/IP Stations along the pipeline route and acceptance by IGGL.
b) Taking consent from the land owners.
c) Collection of revenue records, establishing correctness of ownership by search/ revenue records, nil encumbrances etc.
d) Only such legally and technically cleared lands will be considered and given clearance to the contractor for purchase of such lands.

l) The legally cleared agreement shall be given by IGGL.
m) Expediting subsequent formalities including signing of agreements or sale deed if any, to facilitate possession of land by IGGL.
n) Obtaining all required approvals/ no objection certificates from concerned authorities like village panchayats or municipalities etc. under whose jurisdiction each plot of land falls, for constructing and setting up the Sectionalising Valve Stations.
o) Obtaining approvals from concerned for laying cables to the Sectionalising Valve Stations from the anode bed.
p) Registering the land in IGGLs name.
q) Entry of IGGLs name in original Land Records on the acquired plot no. and obtaining copy of the same in support.

Note-11- Bidder scope includes Land for AGB & ROU for cable routing at CP station locations as per the type of Anode bed for the complete Pipeline is in the scope of Bidder except at following locations-

i- DT- Madhuban, Ch 00.00 Km
ii- SV-01, Ch. 16.00 km
iii- SV-02, Ch. 32.50 km
iv- SV-03, Ch. 48.00 km
v- SV-04, Ch. 64.00 km
vi- SV-05 Ch. 80.00 km
vii- IP-01 Ch. 96.00 km
viii- SV-06 Ch. 112.0 km
ix- SV-07 Ch. 128 km
x- SV-08 Ch. 144 km
xi- SV-09 Ch. 160 km

e) Design of shallow/deep-well anode beds for construction at selected locations as per national/ international standard & specification. The type of the anode bed i.e. shallow type or deep well type will depend upon the soil resistivity of the anode bed plot location. CP contractor will submit necessary data for the type of anode bed considered & shall be decided during detail engineering.

f) Design, Supply, installation, testing & commissioning of anode ground bed (Shallow bed size Min. 46x3 mtr or size may increase as per the design calculation), consisting of minimum ten (10) numbers Mixed Metal Oxide Coated Titanium Hollow Tubular Anodes of 25mm dia. / 1000mm long size and **8A Rating** along with tail cable of 1C x 10mm2 Annealed Stranded Copper conductor, PVDF insulated, HMWPE sheathed/Jacket (Kynar Cable) shall be terminated at AJB at the CP station locations, with anode canister in normal resistivity area (0-100 Ohm-m). Actual numbers of anodes shall be finalized during the approval of design calculation submitted by the Contractor.

In high resistivity area (where resistivity ≥100) anodes shall be installed without canister & anode bed trench of cross-section 300mmx300mm for horizontal type of anode bed shall be backfill by Coke breeze (In slurry form) for its full length.

Anode Ground Bed resistance should be maintained less than 1 Ohms (Max.).

MMO anodes shall be as per ASTM B861 GR-I.

g) In case of deep-well anode bed, supply, installation, testing & commissioning of individual anodes in vertical installation, consisting of minimum ten (10) numbers of Mixed Metal Oxide Coated

Titanium

Tubular Anodes of 25mm dia./ 1000mm long size and **8A Rating** with tail cable of 1C x 10mm2 Annealed Stranded Copper conductor, PVDF insulated, HMWPE sheathed/Jacket (Kynar Cable) shall be terminated at AJB. Actual numbers of anodes shall be finalized during the approval of design calculation submitted by the Contractor. Design of deep anode-bed shall be as per NACE:0572:2007 requirements.

MMO anodes shall be as per ASTM B861 GR-I.

Anode Ground Bed resistance should be maintained less than 1 Ohms.

Minimum depth of anode bed shall be 48m (As per drawing) & it may increase as per the survey data. The bore hole shall be filled by coke breeze in slurry form.

h) Anode bed backfill material bulk density shall be 1200/KG/M3 and other requirements shall be as per NACE:0572.

i) Disconnection of temporary cathodic protection system which does not form part of permanent cathodic protection system, prices for disconnection of temporary cathodic protection system is integral part of bid & deemed to be inclusive in prices quoted by the Bidder.

j) Supply, laying, termination, glanding and ferruling of all the cables of CP system, including all incoming power cable and outgoing CP cables of CPTR/ CPPSM units.

k) Minimum nos. of CP stations considered are mentioned in cl no. a), however actual numbers of CP stations shall be finalized during the approval of design documents submitted by the Contractor, but it won't less than the minimum mentioned. The nos. of CP stations may increase during the detailed engineering, Bidder shall supply, Install & commission the increased CP stations without any extra cost implication to protect the pipeline. PCP system shall be designed in such a manner that TR/CPPSM units comes at Intermediate SV station locations. The proposed locations of CP stations may also change during the detail engineering.

l) Supply, installation & commissioning of Min 3 Nos. permanent references cell (Zn type) each at the proposed locations for CP stations locations. (Design criteria for Zn type ref electrode is given in design basis) The installation locations of reference cell shall be decided during detail engineering.

Bidder to note that at D/T, R/T stations min 02 additional ref cells shall be installed at each pipeline terminating/originating from the stations & all measurement /Ref cable shall be terminated to the CP stations. CP unit shall have selector switches for required no. of inputs of ref available as per the nos. of ref cells of pipeline terminating/originating at station and provision to select the ref PSP of any of pipeline in CP unit. Separate local monitoring meter shall also be provided in CP units. Multi-core signal cable of suitable pair shall be considered for the measurement cable & reference cell cable from CJB to TR unit. (For this bidder may consider 8/12 pair, Multi-core, FRLS, 2.5 Sqmm, 8/12 pair, twisted pair, shielded, armoured, signal cables as per IS/BS).

One permanent reference cell with one measurement point connection shall also be installed on the unprotected side of the pipelines at DT & RT and wired upto the CPTR unit and to SCADA by 4-20mA signal to the SCADA for remote monitoring and accessing integrity of the IJ.

m) Separate drainage connections are to be made with separate junction box (having provision to

control the current) to each pipeline at IP station location feeding from the common CPPSM/CPTR unit.

Note-CJB & Bond Junction box shall be FLP type, if installation in Hazardous area, IP-55 in case of installation in safe area.

n) Supply, installation, testing & commissioning of Computerized Test Stations (CTSU) with Permanent Zn/Cu-CuSo4 ref electrode & portable data readers 2 nos. along with permanent reference cell (Zn/Cu ref cell) for automatically monitoring through GPS and recording the pipe to soil potential, pipe current etc of the pipeline. Locations of CTSU shall be decided during detailed engineering.

Note-12

CTSU shall be able to record Simultaneous recording of 3 No. analogue channels, generate +ve & -ve sign for recorded PSP values, Battery Low alarm. Spare Battery Pack shall be supplied with each CTSU.
The test stations shall be designed for installing and mounting portable data logger inside with theft proof design.

o) Supply including design, manufacturing, shop testing, inspection, packing, forwarding, delivery erection/ installation, civil/ structural support, earthing, testing & commissioning of Min. 48V/25A or higher rating output CPTR/CPPSM unit each at CP station locations confirming to standard specification No. MEC/05/S/26/82A, data sheet & Drawing. The CP units shall be installed inside the control room. All the CP units shall have SCADA monitoring facility, current interruption facility with timer (GPS Synchronized) etc as per specification including commissioning spares as required. Current shall start/stop/reset from local as well as from remote thru SCADA. Current interrupter shall be configurable from 0.1 sec to 999 sec. Minimum 30 mtr GPS cable shall be provided with each CP unit.

p) Bonding in between pipelines running parallel or crossing as required. Taking of permission from the owner (By Owner) of the foreign pipeline wherever required for effective PCP protection and to reduce the anodic interference among them. Interference surveys and mitigation shall be carried out for both the pipelines i.e. proposed and existing. Other CP related surveys for existing pipeline is not applicable. For proposed new pipeline all CP related survey to be carried out and DC interference mitigation measures shall be implemented for both the pipelines.

Bonding with existing/new CP system of parallel pipelines hook-up methodology shall be designed by the NACE CP specialist after conducting all required field surveys including details study of existing PCP system & previous PCP system problems of existing pipeline in common ROU and its mitigations.

q) In case, anode ground bed of foreign pipeline existing within the ROW of proposed pipeline & is source of interference to the proposed pipeline, the contractor shall relocate the anode ground bed in consultation with Owner of foreign pipeline without any extra cost.

r) The contractor shall carry out interference detection and mitigation measures for all the pipelines including detection of AC and DC interference on pipeline's and its mitigation due to proximity of foreign AC and DC source i.e. HT line (Parallel, Crossing), Underground HT Cables in proximity, substation, railway traction, welding yard, existing pipeline running parallel or crosses & other foreign pipeline/structure/utilities, HVDC Interference. For the interference detection & mitigations

(AC & DC interference study & mitigation) the contractor shall include the services of specialist agencies having proven track records & experience on software modelling & recommendation for its mitigation.

Pipeline AC Interference studies & Mitigations measures including measurement of AC pick-up due to long term (Induced, conducting due to transformer neutral, fault) & short term interference (Ground Fault, Lightning, conducting etc) as per field data collected, AC corrosion study (As per BS EN 15280 - Evaluation of A.C. corrosion likelihood of buried pipelines applicable to cathodically protected pipelines), Effect of HT line/ Cables running parallel/crossing the pipeline and discharge of current from nearest HT tower/Substations due to fault or lightning etc. Implementations of interference mitigative measures on pipeline's bring down these voltages (touch & step potentials) to safe limits as per the National/International standards & other mitigation measures to reduce the AC corrosion densities. Mitigation measures suggested by the bidder shall be submitted for review and approval to Engineer-In-Charge.

As a part of AC interference detection, the following AC modeling shall be done by the contractor through an expert agency/contractor itself should have experience as mentioned in BEC clause as approved by MECON/IGGL. (Expert agency/Bidder shall be in the field of interference study and mitigation work for minimum 05 years.) :

- The software suggested for AC modelling shall be of SES's Right-of-Way Pro software/ (Elsyca) or equivalent approved which can model complex arrangements of buried and above ground conductors and computes currents and voltages resulting on every utility modelled, including conductors associated with the power line, for normal (load) and fault conditions.

- Software package for the analysis of electromagnetic interference between electric power lines and adjacent installations such as pipelines, communication lines and railways and able to model a large network including multiple power lines and pipelines in one model and have Large Conductor database to choose from including most transmission line conductors and mitigation devices like Zinc ribbon, Diodes, SSPC and copper wire Mitigator, etc. Copper wire Mitigator shall have Outer wrapping (Sealed, porous, non-degrading acid reducing fabric) and braiding with carbon backfill with copper corrosion inhibitors for long life. Dia and installation length of the mitigator shall be as derived by the software modelling.

- Software package have ability to model transformers, transmission system (AC/DC), sub stations, Faults Modelling etc.

- Provide results on Touch and coating stress output, GPR, CSV (Coating stress voltage) & AC corrosion output (AC corrosion densities) on whole modelled pipeline.

- Have Multi-layer Soil Resistivity Model.

The software shall be capable to:

- Analyses electromagnetic interference effects, currents and voltages in every span of a multi-conductor, multi-phase power network and in any neighbouring victim circuits sharing the same corridor with pipeline.

- Capable of modelling a total interference scenario consisting of inductive, conductive and capacitive interference and generating outputs based on different current loading conditions in different seasons.

- Capable to calculate mitigating measures with sizing the SSD's (Solid State Decoupler devices), earthing devices & earthing system to reduce the AC interference.

- Able to generate outputs for true Touch Potential, and 1 cm2 coating holiday current density output in amperes per square meter to analyse the effects of AC Corrosion on a pipeline.

- All required data of pipeline, soil resistivity; HT lines, sub-station and other interfering sources as suggested by interference specialist shall be collected CP contractor/Expert agency and reviewed by the NACE CP specialist.

- Mitigations of Interference as per the results of software modelling are in the scope of the Bidder.

- Mitigation measure location details with detailed BOM

- Post mitigation verifying the induced voltage/ current density

- The agency proposed by CP contractor shall be subject to acceptance as per sole discretion of MECON / IGGL.

Pipeline DC Interference studies & Mitigations measures shall also be carried out due to proximity of DC interference source. GPS coordinates of all HT tower locations, distribution transformers, Foreign Pipeline crossings & other interfering source shall be taken during field data collection.

For the interference detection & mitigations (AC & DC Interference study & Mitigation) the contractor shall include the services of specialist agency or will carry out the same on their own as per the BEC requirement as mentioned in the BEC clause of this document.

Interference detection & mitigation due to DC sources (i.e. HVDC transmission lines. DC traction, foreign pipelines passing parallel, crossing etc) shall be carried out as per ISO 21857:2021: Protection against corrosion due to stray currents from DC installations and other applicable standards.

The contractor shall handover interference free CP system to M/s IGGL. If IGGL/MECON desires, contractor have to take opinion from specialist other than the hired agency for the Detection/ Mitigation of interference, recommendations, if any is in the scope of the contractor with no additional cost.

CRITERIA FOR AC INTERFERENCE –Refer standards specification no. MEC/TS/05/E9/016B cl no. 12/ Design Basis (Cl no. 8 & 10).

CRITERIA FOR DC INTERFERENCE –Refer standards specification no. MEC/TS/05/E9/016B cl no. 6.0/Design Basis (Cl no. 8 & 10).

DATA COLLECTION FOR INTERFERENCE STUDY

Contractor shall carry out field survey for collecting data required for the Interference survey from various authorities like Power Authorities/ Foreign facility Owners (Pipeline, substations, welding shops, HVDC line and its convertor stations etc as required for the interference simulation which includes following.

- Existing or proposed (33 kV & above) EHV/HV AC/ DC overhead power lines along with details of voltage, AC/DC type etc, crossing or parallel to the pipeline, phase configuration, number of circuits and other line parameters.
- Voltage rating, phases, sheathing details of underground power cables along ROW or in its vicinity.
- Substations (33kV and above) in the vicinity of the pipeline and pole mounted (11kV) substations.
- Tower footing, earthing distance from tentative ROU to be recorded for ascertaining safe distance.
- Fault current rating of each HT line, designed load current, operating load current Location of grounding of tower and substation location etc. to be obtained from power companies.
- Multi-layer soil resistivity near the area of AC tower parallel or crossing.

REPORT

Recommendation shall be for both operating load and design load of the pipeline. AC/DC interference mitigation report shall have the following:

- Mitigation measure location details with detailed BOM
- Type of grounding: distributed vertical zinc ground anodes, horizontal zinc ribbon anode, multiple zinc ribbon anodes, independent deep ground beds. The grounding system shall be de-coupled with the ICCP system using suitably located and rated solid state decouplers.
- Location of TLP's where AC corrosion coupons/ Polarization coupons shall be installed for monitoring the induced potentials and AC current densities for safe operation of the pipeline.
- Locations of additional TLP's for interference mitigation

Post commissioning, the values of current density and AC induced voltages shall be measured at site and the same cross-checked with the modelled values, the overall profile of the site data and the modelled data as seen over a segment shall be in similar.
Specialist agency shall also verify the induced voltage/ current density after the mitigation are taken care & installed at the site.

s) Supply installation testing and commissioning of AC Corrosion Coupon Shall be provided at HT interference affected area with provision to disconnect (disconnecting strip) the ZN grounding anodes.

t) The contractor shall carry out following post commissioning surveys (As per OISD/PNGRB)-

1) Close interval potential logging survey for entire length of 16" pipeline,
2) CAT survey (entire length of 16" pipeline @ every 50m of pipeline ROW) including measurement of depth of the buried pipeline,
3) Coating conductance survey at B type stations & Pipeline current mapping (B type TLP to be given in every 5 KM. Survey to be carried out as per NACE TM102)
4) Current drainage test at all bonding locations for measurement of current with its polarity.
5) Pipeline total protective current density measurement Shall be carried out by measurement of the total CP current in the CJB, total surface area of the structure. After completion of all post commissioning surveys, interference mitigation, before handover of the CP system to Owner.
6) Casing & Carrier short surveys (After PCP system commissioning), Shall be carried out at all Cased crossings. (As per NACE : SP 200)

7) DCVG or CAT with frame 'A' / ACVG survey at Full length of pipeline @signal strength of minimum 1500 mV at mid-points of TLP. (All defects including minor holidays shall be excavated and repaired, in scope of contractor)

u) The TR/CPPSM units shall be provided with facilities for sending and receiving digital and analogue input/output signals for remote SCADA monitoring.

v) Supply and installation of the power supply cable from switch fuse unit/ MCC /PDB of OWNER'S Electrical substation to CPPSM/CPTR Units shall be CP Contractor's scope of work.

w) Supply of Two Years O&M Spares as described in Appendix-II at Two locations.

x) Monitoring & maintenance (as a whole) of PCP System of entire length of 16" 3LPE Coated pipelines for 6 months (Monthly Basis) including collection of data from data loggers after commissioning of PCP works simultaneously with post commissioning survey work.

y) Supply, Installation, Testing & commissioning of AC corrosion coupons (exposed area 1cm2) for monitoring of AC corrosion densities at HT line crossings and AC interference prone area along with high accuracy AC shunt (Additional 10% quantity of coupons shall be also be considered).

z) The material shall be checked as per the packing list of the vendor without opening of the boxes for physical verification jointly verified by Purchaser/Consultant.

aa) Preparation and submission of As-Built drawings/documents including installation reports, final commissioning report for PCP system.

bb) All civil/ structural & other miscellaneous works related to PCP system including supply of bricks, cement & steel etc. required for completion of the system.

Notes-

Note-14:-The distance between the anode bed & Pipeline shall be as per the remoteness calculation between pipeline & anodebed, successful CP contractor will submit the remoteness calculation of the anodebed based on actual site data collected.

Note-15:- It may be noted that the size of plot/land for anode-bed mentioned above may increased from the minimum specified (As per the design) Accordingly, the suitable size land for anodebed shall be acquired.

Note-16:- At saline soil Ag/Agcl Permanent Reference electrode shall be used.

Note-17:- Vendor list of Make of CP Materials is enclosed with the tender as appendix-I all CP material shall be as per the make mentioned in the vendor list.

Note-18:- The CP contractor/s shall handover interference free CP protected pipeline to the owner.

Note-19- TR/CPPSM unit shall be designed and manufactured as per the design criteria mentioned for the Zn type permanent ref cell.

Note-20: - For chainages refer Pipeline Schematic Route Diagram

Note-21:- Permanent reference shall be provided with back fill.

10.4 **Tentative Bill of Material**

Tentative bill of material of TCP shall be prepared by the successful contractor for each section/part as per the approved design and the same shall be submitted with the detail engineering package for review.

10.5 **Other Miscellaneous Works**

i) The job includes all civil works including supply of bricks, cements steel etc. connected with grouting of equipment to be installed. The job includes repairing of all civil works damaged during installation of electrical and other facilities.

ii) Preparation of buried cable trenches including excavation, back filling, compacting, providing of brick protection by second-class bricks, spreading of fine river sand, including all supplies.

iii) CP contractor shall provide Colour code identification for the various CP System cables used in the system with design document for approval.

iv) The scope of work under this contract shall be inclusive of breaking of walls and floors, and chipping of concrete foundations necessary for the installation of equipment, materials, and making good of the same. Minor modifications wherever required to be done in the owner free supplied equipments or devices to enable cable entry, termination, etc.

v) Checking of all connections, i.e. power, control, earthing and testing and commissioning of all equipment erected and/or connected under this contract as per testing procedures and instructions of Engineer-in-Charge.

vi) Armour of the cables of MOV or other cables which creates leakage of the CP currents shall be cut to prevent the leakage of CP current.

vii) All electrical equipments are to be doubly earthed by connecting two earth wires from the frame of the equipment to be earth grid. The cable armours will be earthed thro'cable glands.

The following shall be earthed:

- All non-current carrying metallic parts of electrical equipments such as lighting and power panels, push button stations, cable trays etc.

viii) Supply and installation of all other accessories not specifically mentioned herein but nevertheless necessary for completion of job.

ix) Engineering and preparation of specifications, data sheets, procedures and drawings etc required for procurement & installation of CP System wherever applicable/required by Owner/ MECON and submit to Owner/ MECON for approval/comments.

x) Supply and installation of all other accessories not specifically mentioned herein, but nevertheless, necessary for completion of the job including any other material required as per tender terms and conditions for successful commissioning of TCP and PCP.

xi) Correction and submission of all owners' drawings for as-built status.

xii) Obtaining clearance for energising the complete electrical facilities covered under this tender and approval of installation/drawings from Govt. authority if required.

xiii) Test certificates, catalogues, vendor drawings, installation, operation and maintenance manuals for all equipment/materials in contractor's scope of supply.

xiv) All civil work related to the CP work is in scope of the CP contractor.

xv) Co-ordination with other Contractors/Pipeline contractor.

10.6 WORK CONTRACT

The entire work as per Scope of Work covered under this contract shall be treated as "Works Contract".

All works included in the scope of CP work will be done simultaneously with main pipeline construction by main pipeline Contractor. Bidder will supply all the materials required for completing the system and organise manpower & equipments accordingly to meet the requirement of Cathodic Protection work in time as per completion schedule given in Volume - I.

10.7 SCOPE OF SUPPLY

10.7.1 Owner's Supply – NIL

Supply, testing, Packing, Forwarding, Delivery, Installation and commissioning of all the equipment covered in this package are included in the scope of the contractor. No equipment will be free issued by the owner to the contractor.

10.7.2 Contractor's scope of supply shall be as mentioned in Cl. No. 9.1 & 9.3.

10.7.3 Bidder shall submit list of two year operational & maintenance spares along with offer.

O&M CP Spares/ Tool / Tackles for CP system like Multimeter, Clamp meter, Portable reference cell, UT meter, Tool box Complete for each maintenance base etc.

List of O&M spares is enclosed with appendix-II.

All commissioning & start up spares are in bidder's scope (Included in this package). Any commissioning & startup spare consumed during the start up & commissioning is included in the supply of this package, for which no extra payment is made.

1. Contractor to note that the exact cable routing shall be decided at site based on actual site conditions. Exact cable quantities/sizes shall be based on actual measured route lengths at site by Contractor in coordination with Engineer-in-Charge/Client. Contractor shall ensure that there is no surplus or shortage of cables at site and procure cables accordingly.

2. Contractor to note that all cabling (including supply & laying) & other electrics for the CP System shall be supplied along with the package and no separate payment shall be admissible for the same. Owner shall provide only single point power supply for the same.

3. Job is lump-sump basis, price breakup shall be submitted to the Engineer-In-Charger & IGGL for approval for payment purpose for TCP & PCP work, however the work to be carried out & material to be supplied for this project which is not covered under this contract the payment shall be done as per unit price on submission of the back invoice's documents & GST bill.

11.0 STATUTORY APPROVAL OF WORKS

The submission of application on behalf of the Owner to Govt. Authority/ Central Electricity Authority/State authority/Private bodies, if required along with copies of required certificates complete in all respects, shall be done by the contractor well ahead of time so that the actual commissioning is not delayed for want of approval from respective authority. The actual inspection of work by the above-mentioned authority inspector shall be arranged by the Contractor and necessary coordination and liaison work in this respect shall be the responsibility of the contractor. However, any fee paid to these Authorities in this regard shall be reimbursed by the Owner on submission of bills with documentary evidence.

The Inspection and acceptance of the work as above shall not absolve the Contractor from any of responsibilities under this contract.

The necessary permissions required for the bonding etc for the interference mitigation (From SEB's, Water works Departments/ Boards, Railways & Other pipeline owners) shall be obtain before taking mitigation measures in the scope of contractor & the same will be hand over to IGGL after commissioning of CP system.

12.0 QUALITY ASSURANCE, INSPECTION AND TESTING

All the equipment supplied by the contractor shall be inspected by the Owner/MECON and/or their approved inspection agency (TPI) at the manufacturer's works prior to despatch. The equipment will be inspected as per the tests pre-identified in the approved QAP to ensure conformity of the same with relevant approved drawings, data sheets, specifications, National/International standards. The TPI shall be arranged by the CP contractor for the testing of the material/equipments at the vendor works.

12.1 Performance tests of any equipments which cannot be conducted/demonstrated either partially of wholly at the manufacturer's work, shall be conducted after erection at site in the presence of Owner & their inspection agency. In all the cases, prior approval of the approval shall be obtained.

12.2 In case of waiver category of items, the same shall be pre identified. For such items, the contractor shall furnish necessary certificates, test reports etc for Review/Approval to Owner/Inspection agency. The issue of Inspection Certificate/Waiver Certificate for any equipment or component thereof does absolve the contractor from his contractual obligations towards subsequent satisfactory performance of the equipment at site. Should any equipment be found defective, In whole or part thereof after receipt at site or during erection/commissioning and testing shall be Rectified/Changed by contractor free of cost.

12.3 Contractor shall submit test plan for the equipment's with four-week advance notice.

12.4 The following equipment/items shall be tested and inspected by MECON/ owner at manufacturer's works before dispatch. Test certificates duly signed by MECON/ Owner shall be issued by the contractor as part of the final document.

- Hazardous area equipment
- CP TR/ CPPSM units

13.0 TESTING & COMMISSIONING

13.1 The successful bidder shall submit detailed installation, site testing & commission procedure with time schedules for Review/Approval to Owner/MECON.

13.2 The successful tenderer shall provide adequate supervisory/ skilled personnel and all tools and tackles, testing equipment and instruments required for complete checking of installations and testing and commissioning of all equipment and accessories.

13.3 All the tests shall be conducted in the presence of Owner/ MECON/Engineer-in/charge or his authorized representative unless he waives this requirement in writing.

13.4 The testing and commissioning of all equipment under the scope of the bidder & shall be carried out in accordance with the latest edition of relevant Indian Standards, International Standard NACE standards and IE Rules.

13.5 Test reports shall be submitted in required number of copies duly signed by the ***Bidder*** to ***MECON*** and ***OWNER***.

13.6 On successful completion of erection of each item /equipment, a final inspection will be carried out at site by **Owner / MECON**, for correctness and completeness of erection.

13.7 After the completion of all tests and rectification of all defects pointed out during final inspection, start-up trials would be commenced. During the start-up trials contractor shall provide skilled / unskilled personnel and supervision round the clock at his cost. The number and category of workmen and duration up to which required, will be decided by the Engineer-in-charge. Any defects noticed during the start-up trial relating to the equipment supplied and work carried out by the Contractor, will be rectified by the contractor at his own cost.

13.8 Any work not conforming to the execution drawings, specifications or codes shall be rejected forthwith and the contractor shall carry out the rectification at his own cost.

13.9 After the operating conditions are fully achieved for CP system and the other requirements as stated in the General Conditions of Contract are fulfilled, the contractor would be eligible for applying for a completion certificate.

14.0 DRAWINGS, STANDARD SPECIFICATION AND INSTALLATION STANDARDS

14.1 The drawings accompanying the tender document are indicative of the nature of work and issued for tendering purposes only. Construction shall be as per drawings/specifications issued/ approved by the Owner/ MECON during the course of execution of work.

After the job completion, contractor shall prepare 'AS-BUILT' drawings, final certified as built drawings vendor drawings for bought out equipments shall be submitted by the contractor to owner in bound volume with one set of reproducible original sepia plus five sets of prints & one set to MECON.

The equipments/ materials to be supplied by the contractor shall conform to the requirements of the applicable standard specifications. Also the installation of various material/ equipment shall also conform to the standard specification.

The purpose of the pipeline alignment drawings, P&IDs & Plot Plan drawings enclosed with the tender is to enable the tenderer to make an offer in line with the requirements of the Owner. These are indicative of the nature of work and issued for tendering purposes only. The bidders, however, shall visit the site before bidding for proper information of site conditions. Construction shall be as per drawings/ specifications issued/ approved by the Owner/ Consultant during the course of execution of work and no additional payment shall be made for any changes made and bidder shall supply the package at no additional cost and time to Owner.

A) SPECIFICATION

1. Specification for TCP system **MEC/TS/05/E9/016A**
2. Specification for PCP system **MEC/TS/05/E9/016B**
2. Specification for Corrosion Survey **MEC/TS/05/21/016C**

B) DATA SHEETS & QAP

1. Quality Assurance Plan **MEC/05/E9/Q7QP/QAP/082**
2. Data- sheet for Cathodic Protection TR Units **MEC/DS/05/E9/082A**
3. Data- sheet for Cathodic Protection CPPSM Units **MEC/DS/05/E9/082**

C) STANDARD DRAWINGS

1.0	Prepacked Zinc Anode	MEC/SD/05/E9/E/CP/1601
2.0	Prepacked Mg Anode	MEC/SD/05/E9/E/CP/1602
3.0	Mg Ribbon anode for Grounding	MEC/SD/05/E9/E/CP/1603
4.0	Details of Test Station for TCP	MEC/SD/05/E9/E/CP/1604
5.0	Test Station Connection Schemes	MEC/SD/05/E9/E/CP/1605
6.0	Galvanic Anode Installation	MEC/SD/05/E9/E/CP/1606
7.0	Zinc Ribbon Anode for Cased Crossings with Coated Casings	MEC/SD/05/E9/E/CP/1607
8.0	Pipeline Grounding Through Polarisation Cell and Galvanic Anodes	MEC/SD/05/E9/E/CP/1608
9.0	Details of Zinc Grounding Cell	MEC/SD/05/E9/E/CP/1609

10.0	Permanent Copper – Copper Sulphate Reference Cell & Installation Details	MEC/SD/05/E9/E/CP/1610
11.0	Shallow Anode Ground Bed (PCP)	MEC/SD/05/E9/E/CP/1611
12.0	Anode Lead Junction Box	MEC/SD/05/E9/E/CP/1612
13.0	Casing Pipe Detail	MEC/SD/05/E9/E/CP/1613
14.0	Test station for polarization cell	MEC/SD/05/E9/E/CP/1614
15.0	Deep well anode bed	MEC/SD/05/E9/E/CP/1615
16.0	Connection scheme for hooking through CJB/TLP	MEC/SD/05/E9/E/CP/1616
17.0	Details of thermit weld for cable to pipe joint	MEC/SD/05/E9/E/CP/1618
18.0	Installation details of Polarization coupons	MEC/SD/05/E9/E/CP/1619
19.0	Electrode for earthing system	MEC/SD/05/26/23/01
20.0	Earth Electrode in Test Pit	MEC/SD/05/26/23/02

14.2 **Drawings for Tender purpose enclosed with construction tender**

Schematic Route Diagram
P&ID
Plot Plan

14.3 **Survey Drawings/ Details**

a) Overall Schematic Route Diagram

15.0 RESOURCES FACILITIES

15.1 **Recruitment of Personnel by Contractor**

The Contractor shall not recruit personnel of any category from among those who are already employed by the other agencies working at the sites but shall make maximum use of local labour available.

15.2 **Construction Water and Power Supply**

No water and power will be provided by the owner. It should be the responsibilities of the contractor to arrange water and power at his own cost.

15.3 **Land for Residential Accommodation**

Owner shall not provide any land for residential accommodation of contractor's staff and labour. Space for storage of material is included in contractors scope. Contractor shall be responsible for safety and security of his equipment, supplied material, etc.

16.0 PROJECT SCHEDULING & MONITORING

The following schedules/documents/reports shall be prepared and submitted by the Bidder/Contractor for review/approval at various stages of the contract.

16.1 **Along with Bid**

b) Time Schedule

The Completion Time Schedule for the work (including mobilization period) as given in VOL-I of in all respect, from the date of issue of letter/Fax of Intent.

The Bidder is required to submit a Project Time Schedule in Bar Chart Form, along with the Bid. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner interface activities shall be clearly identified with their latest required dates. Owner reserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line with the over all Project requirement.

c) Scheduling & Monitoring System

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package and sample outputs.

16.2 **After the Award of Contract**

a) Overall Project Schedule

The Contractor shall submit within 2 week of Fax of Intent, a sufficiently detailed over all Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.

The network will be reviewed and approved by Engineer- in-Charge and the comments if any shall be incorporated in the network before issuing the same for implementation. The network thus finalised shall form part of the contract document and the same shall not be revised without the prior permission from Engineer-in- Charge during the entire period of contract.

b) Progress Measurement Methodology

The contractor is required to submit within 2 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/ delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner reserves the right to modify the methodology in part or in full.

c) Functional Schedules

The contractor should prepare detailed functional schedules in line with network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and construction.

16.3 **Project Review Meetings**

The Contractor shall present the programme and status at various review meetings as required.

Weekly Review Meeting

Level of Participation : Contractor's/Consultant's RCM/ Site In-charge & Job Engineers.

Agenda :
a) Weekly programme v/s actual achieved in the past week & programme for next week.
b) Remedial Actions and hold up analysis.
c) Client query/ approval.

Venue : Site Office

Monthly Review Meeting

Level of : Senior Officers of IGGL/MECON and Participating Contractors.

Agenda :
a) Progress Status/ Statistics
b) Completion Outlook
c) Major hold ups/slippages
d) Assistance required
e) Critical issues
f) Client query/ approval

Venue : IGGL/MECON Office/ Site Office

16.4 **Progress Reporting Proforma**

A) Monthly Progress Report

This report shall be submitted on a monthly basis within 10 (ten) calendar days from cut-off date, as agreed upon covering overall scenarios of the work. The report shall include, but not limited to the following:

- Brief Introduction of the work.
- Activities executed/ achievements during the month.
- Schedule versus actual percentage progress and progress curves for Detail Engg. Sub-ordering, Manufacturing/ Delivery, Sub-contracting, Construction, Commissioning and Overall and quantum wise status & purchase orders against schedule.
- Area of concern/ problem/ hold-ups, impacts and action plans.
- Resources deployment status.
- Annexures giving status summary for drawings, MRs, deliveries, sub-contracting and construction.
- Procurement status for items to be supplied by Contractor.

B) Weekly Reports

The report will be prepared and submitted by the Contractor on weekly basis and will cover following items :

- Activities programmed and completed during the week.
- Resource deployed men and machines.
- Quantities achieved against target in construction
- Record of Mandays lost.
- Construction percentage progress schedule and actual.

C) Daily Repots

- Activity programme for the day
- Progress of the previous day and commutative progress.
- Manpower & machinery deployed.

Successful bidder shall submit DPR (Daily progress report) & Monthly Monitoring Report to the owner/MECON as per the format in Annexure-A & B.

16.5 **Progress Reports**

16.5.1 CONTRACTOR shall make every effort to keep the OWNER adequately informed as to the progress of the WORK throughout the CONTRACT period.
CONTRACTOR shall keep the OWNER informed well in advance of the construction schedule so as to permit the OWNER to arrange for requisite inspection to be carried out in such a manner as to minimize interference with progress of WORK. It is imperative that close coordination be maintained with the OWNER during all phases of WORK.

16.5.2 By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER a detailed report covering the progress as of the last day of the previous month. These reports will indicate actual and scheduled percentage of completion of construction as well as general comments of interest or the progress of various phases of the WORK. The frequency of progress reporting by the CONTRACTOR shall be weekly.

16.5.3 Once a week, CONTRACTOR shall submit a summary of the WORK accomplished during the preceding week in form of percentage completion of the various phases of the WORK, to the OWNER.

16.5.4 Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs, test certificate etc. Such progress reports shall be in the form and size as may be required by the OWNER and shall be submitted in at least 3 (three) copies.

16.5.5 Contractor shall prepare daily progress report (DPR) in the desired format and submit it to Engineer-in-charge alongwith schedule of next day to Engineer-in-charge.

17.0 CONSTRUCTION

OWNER reserves the right to inspect all phases of CONTRACTOR's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other duly authorised representatives, made known to the CONTRCTOR present during progress of the WORK and such representatives shall have free access to the WORK at all times. The presence or absence of a OWNER's representative does not relieve the CONTRACTOR of the responsibility for quality control in all phases of the WORK. In the event that any of the WORK being done by the CONTRACTOR or any SUB-CONTRACTOR is found by OWNER's representatives to be

unsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the CONTRACTOR shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS, procedures and SPECIFICATIONS.

17.1 Rules & Regulations

CONTRACTOR shall observe in addition to Codes specified in respective specification, all National and Local Laws, Ordinances, Rules and Regulations and requirements pertaining to the WORK and shall be responsible for extra costs arising from violations of the same.

17.2 Procedures

Various procedures and method statements to be adopted by CONTRACTOR during the construction as required in the respective specifications shall be submitted to OWNER in due time for APPROVAL. No such construction activity shall commence unless approved by OWNER in writing.

17.3 Field Inspection

CONTRACTOR shall have at all times during the performance of the WORK, a Competent Superintendent on the premises. Any instruction given to such superintendent shall be construed as having been given to the CONTRACTOR.

17.4 Erection and Installation

The CONTRACTOR shall carry out required supervision and inspection as per quality Assurance plan and furnish all assistance required by the OWNER in carrying out inspection work during this phase. The OWNER will have engineers, inspectors or other authorised representatives present who are to have free access to the WORK at all times. If an Owner's representative notifies the Contractor's authorised representative not lower than a Foreman of any deficiency, or recommends action regarding compliance with the SPECIFICATIONS, the CONTRACTOR shall make every effort to carry out such instructions to complete the WORK conforming to the SPECIFICATIONS and approved DRAWINGS in the fullest degree consistent with best industry practice.

17.5 Construction Aids, Equipment, Tools & Tackles

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction Equipments, Special Aids, Cranes, Tools, Tackles and testing equipments and appliances. Such construction equipments etc. shall be subject to examination by owner and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER shall be immediately got rectified, repaired or the equipment replaced altogether, by CONTRACTOR. OWNER shall not in any way be responsible for providing any such equipment, machinery, tools and tackles.

The OWNER reserves the right to rearrange such deployment depending upon the progress and priority of work in various sections.
Tie-end between main line and starting point of terminal is included in the scope of contract, as and when main line section is available for Tie-ins.

17.6 ORDER OF WORKS/PERMISSIONS/RIGHT OF ENTRY/CARE OF EXISTING SERVICES

The order in which the WORK shall be carried out shall be subject to the approval of the Engineer-in-charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently.

OWNER reserves right to fix up priorities which will be conveyed by Engineer-in-Charge and the CONTRACTOR shall plan and execute work accordingly.

Existing Service

Drains, pipes, cables, overhead wires and similar services encountered in course of the works shall be guarded from injury by the CONTRACTOR at his own cost, so that they may continue in full and uninterrupted use to the satisfaction of the Owners thereof, or otherwise occupy any part of the SITE in a manner likely to hinder the operation of such services.

Should any damage be done by the CONTRACTOR to any mains, pipes, cables or lines (whether above or below ground etc.), whether or not shown on the drawings the CONTRACTOR must make good or bear the cost of making good the same without delay to the satisfaction of the Engineer-in-Charge.

18.0 DOCUMENTATION

18.1 Drawings and design documents

18.1.1 The following documents shall be submitted along with the offer:

a) Filled up data sheet/Checklist.
b) HSE Policy
c) Bar Charts & Project completion schedule
d) QAP
e) Approx. dimensions of the system
f) Catalogues for CP units, MMO & Sacrificial Anodes, polarization cells, spark gap arrestors, ER Probe, reference cells etc.

18.1.2 The following drawings (in three sets) & documents shall be submitted for approval within 3 weeks of award of contract.

a) Various Procedures of CP system Installation Like- Soil survey (TCP & PCP), Thermit weld, Pin Brazing, Sacrificial anode (Zn/Mg/Ribbon) installations, Test stations & Junction Boxes installation, Cable laying, Installation of polarization cell, External ER probe, Surge diverter & grounding cell, connection & sealing of sacrificial anode, Earthing of above ground pipeline, anode ground bed, CP units etc.
b) Soil survey report and chemical analysis report with marked location vulnerable area with all additional data of HT line, foreign pipeline, Cased crossings, river crossings etc as per specification.
c) QA & QC Procedures.
d) List of two years operation and maintenance spare.
e) Basis of system design and design calculations, equipment selection criteria and sizing calculations, formulae used
f) Detailed design calculations of TCP & PCP system (Complete Design Package).

g) Equipment layout, Cable layout & schedule.
h) Colour code identification for the various CP System cables used in the system
i) Procedures for Various Post commissioning surveys (CPL, CAT, CAT Frame 'A' DCVG, Person survey& coating conductance etc as per OISD requirements).
j) Procedure for AC & DC interference detection & mitigation.
k) Procedure for field testing, pre-commissioning & commissioning of TCP & PCP.
l) Procedure for Monitoring & maintenance of CP system.
m) Detailed design of Anode ground bed, typical lay out drawings for Anode bed connection & installation for CP system.
n) Equipment layout, Cable layout & schedule.
o) TLP's & junction boxes installation & erection details drawings.
p) Incorporation of Anode bed, Polarization cell, surge arrester, TLP, Junction boxes & other relevant feature in CP system design in Alignment sheet, pipeline route diagram & Plot plan.
q) G.A. of TR/CPPSM unit.
r) Schematic
s) Wiring diagram for reference.
t) Tentative Bill of Material

18.1.3 After the job completion, contractor shall prepare AS-BUILT drawings/data sheets and documents, submit catalogues/manuals (O&M) of major brought out items. Final certified as built drawings, documents and manuals etc shall be submitted by the contractor to owner in bound volume with one set in soft copy (CD) plus five sets of prints to owner & one set to MECON.

Other drawings and documents shall be submitted by contractor along with AS-BUILT Drawings/Datasheets-

a) Test documents & drawings for bought out items.
b) Detailed commissioning report of pipeline CP system (TCP & PCP).
c) Warranty certificates as per DLP (defect liability period).
d) Original deed OR Lease agreement for acquired/leased land (In favour of M/s IGGL) for Anode Bed, ROU for cable laying etc shall be handed over to M/s IGGL.
e) As all permissions for interference detection and mitigation is in scope of Owner, After completion of the work contractor shall take NOC from the owner of the foreign pipeline owner and refund the security deposit (if any).
f) Soft/Native files of interference studies shall be provided in pen- drive.

19.0 MAKE OF MATERIAL/BOUGHT OUT ITEMS

An Appendix-I of approved vendors for various major items is enclosed with this tender specification. The bidder shall consider such names only as indicated in the aforesaid list and clearly indicate in the bid the name(s) as selected against these items. For any other item not covered in the list enclosed with this tender document, prior approval shall be obtained by the contractor for its make/ supplier's name.

20.0 INSPECTION OF SUPPLY ITEMS

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner/ Consultant in writing at least 10 days in advance of the date of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ Consultant. All

costs towards testing etc. shall be borne by the contractor within their quoted rates. All inspection of various items shall be carried out based on Quality Assurance Plan, which will be submitted by the Contractor and duly approved by Owner/ Consultant.

21.0 ESCALATION

The Rates quoted shall be kept firm till completion of work and no price Escalation shall be paid.

22.0 DOCUMENTS TO BE SUBMITTED/ PRODUCED ALONGWITH R.A. BILLS

a) Computerized R.A. Bill/ Manual Bill, with IT No./ ST No./ Labour License No. printed thereon.
b) ESI/ EPF clearance certificates for the last month along with R.A. Bills.
c) Insurance Policy as per relevant clauses of Contract Agreement.
d) Attendance Register and Salary Records.
e) Photocopy of the measurement book to be attached with R.A. Bills.
f) Any other document required for the purpose of processing the bills.
g) Registration Certificate with Sales tax authorities of state concerned.

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APPENDIX-I

Sheet 1 of 2

1.0 APPENDIX-I (LIST OF SUPPLIER/S OF MAJOR BOUGHT OUT ITEMS)

1) CABLES

i) Brooks Cables
ii) Nicco Corporation Ltd
iii) CMI Ltd
iv) Delton Cables Ltd
v) KEI Industries
vi) Torrent Cables
vii) Universal cables
viii) Victor Cables
ix) Associated Flexible & Wires Pvt Ltd
x) Asain Cables (RPG Cables)
xi) Fort Gloster (Gloster Cables Ltd)
xii) Finolex Cable
xiii) Rediant Cables
xiv) NETCO Cables Pvt Ltd
xv) Chandresh Cables Ltd
xvi) RR Kabel Ltd,Vadodara
xvii) GemsCab
xviii) Icon cables (For signal cable only)
xix) Suyog Cables

2) JUNCTION BOX (FLP Type)

i) Exprotecta, Beroda
ii) Baliga
iii) Flexpro
iv) FFLP Control Gears
v) Sterling
vi) Sudhir

3) SACRIFICIAL ANODES

i) M/s Scientific Metals Engineers Pvt. Ltd., Karaikudi
ii) M/s Shakti Enterprises, Ahmedabad
iii) M/s PSL Holding Pvt. Ltd., Mumbai
iv) M/s BHEL, Bhopal
v) M/s Nippon Corrosion, Japan
vi) M/s AFIC, KSA
vii) M/s Platt Bros. and Company, USA
viii) M/s YUXI, CHINA
ix) M/s Wilson Walton International
x) M/s XIANG METAL, CHINA
xi) M/s SHUNRUI, CHINA
xii) M/s Impalloy International
xiii) M/s Corrpro International
xiv) M/s HOCKWAY, UK
xv) M/s NAKABOHTEC, Japan
xvi) Advance Electronics System Vadodara

4)	Portable Reference Cell	:	M/s MC Miller (USA) or Equivalent
5)	Permanent Reference Cell	:	M/s Borin Manufacturer USA, M/s MC Miller USA , M/s Corrtech, M/s Advance Electronics System Vadodara
6)	AC operated Automatic Transformer Rectifier Unit/DC operated Automatic CPPSM Unit	:	M/s Canara Electric (M/s Raychem RPG Ltd), M/s Kriston systems, M/s Bin Sari Specialized Technologies Corrosion Protection India Private Ltd, Thane, Mumbai M/s Advance Electronics System Vadodara
7)	Thermit Weld Pin Brazing	: :	M/s Erico, USA, M/s Cad Weld M/s Safe Track, M/s BAC UK
8)	Surge diverter (Ex-d)	:	M/s Dhen, M/s OBO, M/s Corrpro system, USA, M/s Sohne
	Surge diverter (Spak Gap) (Non-Ex-d)	:	M/s Advance Electronics System Vadodara
9)	Digital Multimeter	:	MOTWANE, Rishabh, Fluke or Equivalent
10)	CTSU	:	M/s Kriston systems or equivalent
11)	Solid state polaristation cell	:	M/s Dairyland, M/s Corrpro systems, USA M/s Advance Electronics System Vadodara
12)	Anode (MMO Type)	:	1) Titanor Component Ltd., Goa, India 2) Denora Permelic S.P.A (Italy) Oronzio De Nora S.A. Ingano, Switzerland 3) CER Anode Technologies International USA 4) ACTEL, UK 5) ELTECH System Corporation, Texas 6) MAGNETO-CHEMIE, Netherlands 7) M/S MATCOR (USA)
13)	Anode Backfill Material	:	1) M/S Goa Carbon (Goa) 2) M/S India Carbon (Calcutta), 3) M/S Petrocarbon & Chemical Company (Haldia)
14)	Heat Shrink Cap For Anode To Cable Joint	:	M/s RAYCHEM, M/s MATCOR (USA)
15)	MCCB/MCB for Power Distribution Board	:	Siemens, Indo Asian, L&T, Hager, Merlin Gerin Schneider Electric, AEG, HAVELL'S, ABB, MDS
16)	ER- PROBE (External Corrosion Monitoring)	:	M/s Rose Corrosion Services UK, M/s Metal Samples, USA M/s Roharbak Cosasco, USA M/s Caproco, UK
17)	ER- PROBE & Corrosion Coupon Assembly	:	M/s Rose Corrosion Services UK, M/s Metal Samples, USA M/s Roharbak Cosasco, USA, M/s Caproco, UK
18)	Proposed CP Contractor	:	M/s Corrtech (I) Pvt Ltd, Ahmedabad, M/s CCS (B) Pvt ltd,

(Have to meet criteria in cl no.8)	M/s Raychem RPG Pvt ltd, M/s Consultech, Baroda, M/s UNDTS, Noida, M/s SARK EPC Pvt Ltd, M/s Correxpert, M/s NR Enterprises (Only for TCP)

1) For procuring bought out items from vendors other than those listed above, the same may be acceptable subject to the following: -

a) The vendor/ supplier of bought out item(s) is a manufacturer/ supplier of said item(s) for intended services and the sizes being offered is in their regular manufacturing/ supply range.

b) The vendor / supplier should not be in the Holiday list of IGGL / MECON / other PSU.

The bidder should enclose documentary evidences i.e. PO copies, completion certificates, SOR, Inspection Certificate etc. for the above, along with their bids.

Note-22- (Min. 03 WO/PO with completion certificates shall be provided)

2) For any other item(s) for which the vendor list is not provided, bidders can supply those item(s) from vendors/ suppliers who have earlier supplied same item(s) for the intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supply range.

The bidder is not required to enclose documentary evidences (PO copies, Inspection Certificate etc.) along with their offer, however in case of successful bidder, these documents shall required to be submitted by them within 30 days from date of Placement of Order for approval to IGGL / MECON.

3) The details of vendors indicated in this list are based on the information available with MECON. Contractor shall verify capabilities of each vendor for producing the required quantity. PMC does not guarantee any responsibility on the performance of the vendor. It is the contractor's responsibility to verify the correct status of vendor and quality control of each party and also to expedite the material in time.

Appendix-II
Sheet 1 of 1

2 Years Operational & Maintenance Spares for Temporary Cathodic protection system (One Lot, description of LOT is given below)

Sl. No.	Description	Unit	Total Qty.
1	Multimeter- Fluke 87V Digital Multimeter	Nos.	2
2	Clamp Meter (AC&DC)-Fluke	Nos.	2
3	Portable Cu/CuSO4 Reference Cell –Mc-Miller/Tinkar Razor	Nos.	1 nos. /SV Station
4	UT (Ultrasonic Thickness Tester) Meter –Olympus model 27MG or equivalent	Nos.	2
5	Tool Box-Taparia Make (Consisting of Screw Driver Set, Electrical screw driver set, Adjustable Spanner 12”, Flat File 12”, Round File 12”, Plyer, Chiesel, Hexa Frame, Hexa Blade, Hammer, Nose Plyer, DE Spanner set 6-32, Ring spanner set 6-32”, Allen key set etc.)	Set	2
6	Lab Calibrated reference (Cu-CuSo4) cell to calibrate portable half reference cell	Nos.	2
7	Spare battery pack for CTSU	Nos.	8
8	02 Year O&M CP Spares for TR / CPPSM units		
8.1	TR/CPPSM Unit Spares		
1	Set of control Card Consisting of 1 No. each Type	Set	2
2	AC Circuit breaker(MCB)	Nos.	4
3	DC Circuit breaker(MCB)	Nos.	4
4	AC Voltmeter	Nos.	4
5	AC Ammeter	Nos.	4
6	DC Voltmeter	Nos.	4
7	DC Ammeter	Nos.	4
8	Set of fuse link consisting 1 No. of each Type (Input & Output)	Set	2
9	HRC fuse for Diodes	Nos.	10
10	O/p Filter circuit capacitor	Nos.	2
11	Signal light assembly for annunciation	Nos.	2
12	Input Surge diverter (8/20 uS)	Nos.	2
13	Control transformer	Nos.	2
14	Coarse voltage control switch	Nos.	4
15	Coarse current control switch	Nos.	4
16	Fine voltage control switch	Nos.	4
17	Fine current control switch	Nos.	4
18	Set of Indicator lamps consisting of two no. of each type	Set	2
19	Diode Module	Set	2
20	SCR Module	Set	2

21	Output Lighting Arrestor (10/350 uS- 100kA)	Set	2
22	Assorted Glass cartridge fuses	Nos.	20
23	Set of Rotary Switches consisting of one no. of switch of each type including Auto Manual Mode selector switch	Set	2
24	Set of 4-20mA converter and digital relays (1 no. of each type calibrated)	Set	2
25	Toggle switches	Nos.	10

Note-23-Price of these spares shall deemed to be considered in the total price of supply of CP system quoted by the Bidder.

Annexure-A

Format for Daily Progress report

DAILY PROGRESS REPORT – TCP SYSTEM							
CLIENT:				DPR NO.			
CONSULTANT:	MECON Limited			PROGRESS DATE:			
CONTRACTOR:				REPORT DATE:			
PROJECT:				PLACE:			
S.No.	ACTIVITY	UOM	SCOPE	PROGRESS (Spreads A, B……)			Remarks
				PREVIOUS	TODAY	CUMULATIVE	
1	Soil Resistivity & Chemical Analysis						
2	Additional Data Collection						
3	TCP design Document						
4	P/L LENGTH	KM					
5	P/L LOWERED	KM					
6	TCP PROVIDED	KM					
7	PSP LEVEL	(-V)					
S.No.	Material Work Description						
1	Test station	Nos.					
2	Mg anode	Nos.					
3	Zn anode	Nos.					
5	No. of Thermit	Nos.					
5(a)	No. of Pin Brazing	Nos.					
5	Surge Diverter	Nos.					
6	ER Probe	Nos.					
7	Polarisation Coupon	Nos.					
8	Polarisation Cell	Nos.					
9	Cased crossings	Loc					
10	TCP Cables						
10(a)	1Cx6 mm² Armoured	Mtr.					
10(b)	1Cx6 mm² Un-Armoured	Mtr.					
10(c)	1Cx10 mm²	Mtr.					
10(d)	1CX25 mm²	Mtr.					

DAILY PROGRESS REPORT – PCP SYSTEM (Material Installation)

CLIENT:		DPR NO.	
CONSULTANT:	MECON Limited	PROGRESS DATE:	
CONTRACTOR:		REPORT DATE:	
PROJECT:		PLACE:	

S.No.	ACTIVITY	UOM	SCOPE	PROGRESS (Spreads I, II……)			Remarks
				PREVIOUS	TODAY	CUMULATIVE	
1	Soil Resistivity of Anodebed & Chemical Analysis	Nos.					
2	PCP Design Document	Nos.					
3	Registration of Land of Anodebed	Nos.					
4	Installation of TR Unit	Nos.					
5	Installation of CPPSM Unit	Nos.					
6	Installation of Shallow Anode bed	Nos.					
7	Installation of Deepwell Anode bed	Nos.					
8	Installation of Anode Junction Box	Nos.					
9	Installation of Cathode Junction Box	Nos.					
10	Installation of Permanent Ref cell for CJB	Nos.					
11	Installation of Permanent Ref cell for CTSU	Nos.					
12	Installation of Zinc Grounding anode	Nos.					
13	Installation of Polarization cell	Nos.					
14	Installation of CTSU Unit	Nos.					
15	Cable Laying - 1Cx06 Sq mm	Mtr					
16	Cable Laying - 1Cx25 Sq mm	Mtr					
17	Cable Laying - 1Cx35 Sq mm	Mtr					
18	Cable Laying -	Mtr					

	3Cx10 Sq mm						
19	Cable to pipe connection	Nos.					
20	Pre Commissioning & Commissioning	Kms					
21	AC Interference Survey	Kms					
22	DC Interference Survey	Kms					
23	CIPL Survey	Kms					
24	CAT Survey	Kms					
25	DCVG Survey or CAT with Frame 'A' survey	Kms					
26	Coating Conductance Survey	Kms					

Annexure -B

Format for TCP system Commissioning

Sr. No	TS No	Chainage	TS Type	Natural PSP	Instant PSP	Polarised PSP (24 Hrs.)	Anode Voltage (V)	Anode Current (mA)	AC Voltage (V)	Other Readings (If Any)	Remarks

Format for Monthly Monitoring Report of TCP system

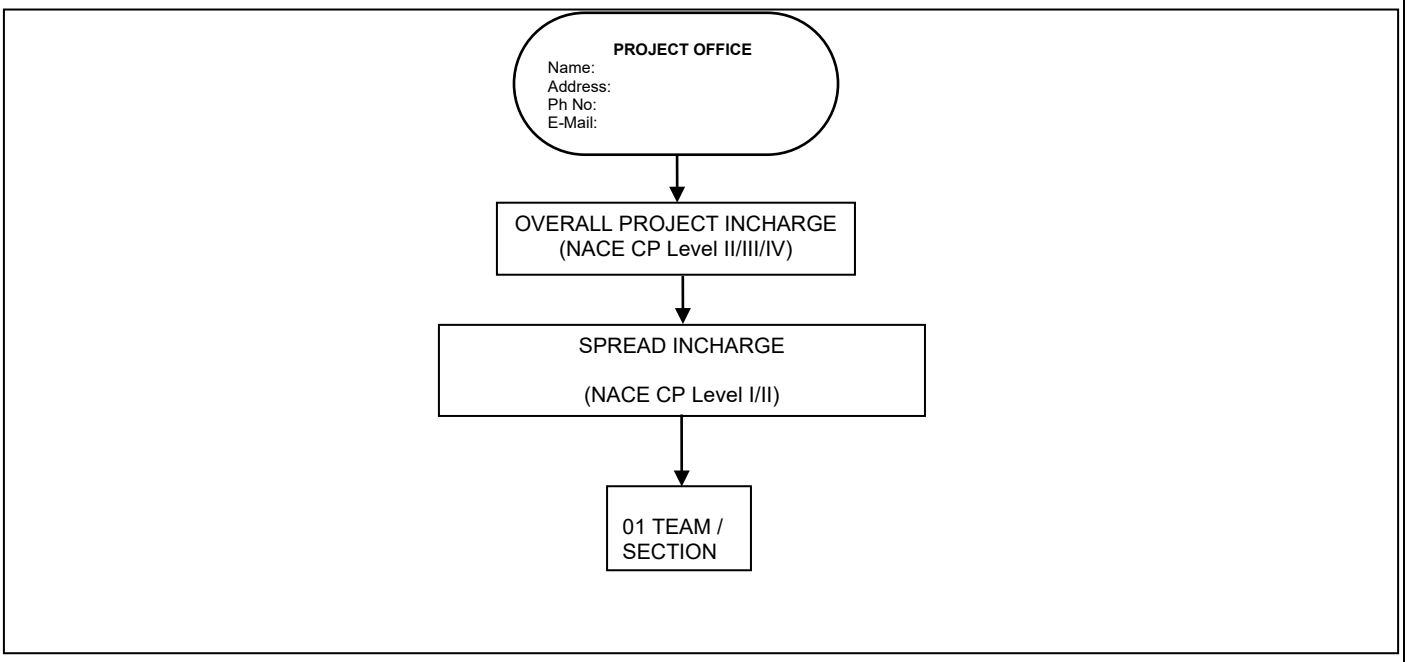
Sr. No	TS No	Chainage	TS Type	PSP (-) Voltage			Anode Voltage (V)	Anode current (mA)	AC Voltage (mV)	Other Readings (If Any)	P. Coupon OFF PSP	Remarks
				Carrier		Casing						
				Without Bonding	Bonding							

Format for Monthly Monitoring Report of PCP system

Sr. No	TS No	Chainage	TS Type	PSP (-) Voltage		Casing PSP	AGB Resistance	CP unit O/P Voltage (V)	CP unit O/P Current (A)	AC Voltage (mV)	Other Readings (If Any)	Remarks
				On	OFF							

Annexure-C

Organogram for the TCP work



Notes-

1. Overall Project In charge should have B.E. in (Electrical, Electronics and Metallurgical Engineering) & atleast 10 year Experience in the Cathodic Protection (NACE CP Level II/III/IV) Field.

2. Spread Incharge should have B.E. or Diploma in (Electrical, Electronics and Metallurgical Engineering) & atleast 5 year Experience in the Cathodic Protection (NACE CP Level I/II) Field and shall be available at site office for entire time schedule of the project.

3. CVs including Experience & Qualification shall be submitted by successful bidder.

Annexure-AA

Compliance to Technical Bid (CP System)

Sl No.	Tender Clause No.	Description	Documents Required for Qualification (Technical Part of Bid)/ Bidder's Compliance/Bidder's Confirmation	Submitted in E-Bid (Bidder to Indicate Yes/No)	Reference In E-Bid Document (Bidder to indicate Place, Page No. /Vol No. In the Bid)
1	-	Technical Compliance to the complete scope of work	Bidder shall furnish "No Deviation Certificate". Deviation if any, due to of change/amendment/revision in design code (vendor specific) shall not be considered at this stage and subjected to review/approval of Client/MECON. (For the acceptance of the deviation in the design code suitable justification is required during detail engineering).		
2	-	Confirm No Deviation in Technical Bid.	Confirm (Offer may be rejected if there is any deviation).		
3	Annexure	Confirm No Deviation.	Confirm (Offer may be rejected if there is any deviation).		
4	Installation, Commissioning & Start-Up spares	All the spares required for Installation, Commissioning & Start-Up of the CP system shall be included in the scope of the bidder, any spares required permanently for the Installation, Commissioning & Start-Up of the CP system the same shall be supplied free of cost.	Confirm.		
5	16.1.1	All the required documents are enclosed with the bid document as per the clause.	Confirm.		
6	Tentative BOQ/BOM	Tentative BOQ/BOM shall be prepared by bidder and shall be reviewed & approved by MECON during the detail engineering stage. As this is a Lump-Sump contract for any change in quantity mentioned in the scope of work the bidder's compensation for these changed quantities shall remain unchanged.	Confirm.		
7	Confirmation on Interference Detection (AC & DC) and Mitigation & cl no. 9.1 (c) (s) (v)	The qualification of the surveyor for these works should be Min NACE Level IV (CP Specialist).	Confirmation, submission of valid certificate & association/employment proof with the Bidder along with consent letter along with Bid.		
8	Interference Modelling Software licence	Bidder/Back up agency shall have valid license/key for Operating Interference Modelling Software.	Submission of relevant document along with Bid.		
9	CV & Qualification documents as per Organogram	Submission of relevant Documents along with Bid.	Submission of CV & relevant qualification document.		

-X-X-X-

	CONTRACTOR		**QUALITY ASSURANCE PLAN FOR** CATHODIC PROTECTION (TCP & PCP SYSTEM)	CLIENT: PROJECT:	**M/s IGGL** DFL FEEDER PIPELINE
	ORDER NO. & DATE			PACKAGE NO.	**E-0085**
	SUB-CONTRACTOR			PACKAGE NAME	**TCP & PCP system**
	ORDER NO. & DATE				

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in tonnes (T) must be indicated under column 5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR

MFR : MANUFACTURER

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS:

Code Description

1. Visual
2. Dimensional
3. Fitment & Alignment
4. Physical Test (Sample)
5. Chemical Test (Sample) (Review of test report only)
6. Ultrasonic Test
7. Magnetic Particle Test (MPT)
8. Radiography Test
9. Dye Penetration Test
10. Measurement of IR Value
    a) Before HV Test
    b) After HV Test
11. High Voltage test/Dielectric test

Code Description

12. Routine test as per relevant IS other standard
13. Type test as per relevant IS/ other standard
14. Impulse Test
15. Partial Discharge Test
16. Heat run risc test\tempr.
17. Enclosure Protection Test
18. Calibration
19. Noise & Vibration
20. Test certificates for bought out components
21. Tank Pressure Test / Pressure Test
22. Paint shade verification & Thichness check

Code Description

23. Short time rating
24. Operational & functional check
25. Over Speed Test
26. Flame Proof Test
27. Clearance and creepage Distance
28. Acceptance Test
29. Material test
30. Coating Thickness (MMO Anode), Resistivity (MMO Anode) & comsumption rate (For Mg, Zn & Zn Ribbon Anode only review of Test report)
31. Contact Resistance anode to cable Joint
32. Destructive testing
33. Test Station Connection Scheme check, Name plate and terminal check
34. Chemical Composition & Open Circuit Potential (For Zn Ribbon Anode, Review of Test report only)
35. Short duration rating (3.7kA @ 30 cycle) & test to verify approved GTP parameter
36. Contineous current discharge (rms) discharge test for 24 hr

DOCUMENTS:

D1. Approved GA drawings
D2. Approved single line/ schematic diagram
D3. Approved data sheet
D4. Approved bill of materials
D5. Unpriced P.O. copy
D6. Calibration Certificate of all measuring instruments and gauges

EQUIPMENT DETAILS							INSPECTION AND TESTS								
Sl. No.	Description (With equipment heading, place of use, and Breif Specifications)	Indentificatuin No.	Quantity		Manufacturer's Name and Address	Expected schedule of Final Inspection	Raw Material and inprocess stage inspection			Final Inspection/Test by			Test Certificates & documents to be submitted to MECON	Acceptance Criteria Standards /IS/ BS/ASME/ Norms and Documents	REMARKS / SAMPLING PLAN
			No/M	T			MFR	CONTR	MECON/ TPI	MFR	CONTR/ TPI	MECON/ OWNER			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	**CP Cables (1Cx6Sqmm, 1Cx10 Sqmm, 1Cx25Sqmm & 1Cx35Sqmm)**	**IW**	**Meters**				**1,2,29**	**-**	**-**	**1,2,28**	**1,2,28**	**IWC**	**D1, D2, D3, D4, D5, D6, 20, 13**	**I.S., Approved Data Sheet & Specifications**	
2.	**Test Stations (Big & Small Type)**	**IW**	**Nos.**				**1,2,29**	**-**	**-**	**1,2,3,4,10 ,11, 22,33**	**1,2,3,4,10 ,11, 22,33**	**IWC**	**D1, D2, D3, D4, D5, D6, 20, 13**	**I.S., Approved Data Sheet & Specifications**	
3.	**Sacrificial Mg & Zn Anodes**	**IW**	**Nos.**				**1,2,29**	**-**	**-**	**1,2,4, 5, 30, 32***	**1,2,4, 5, 30, 32***	**IWC**	**D1, D2, D3, D4, D5, D6, 20, 13**	**I.S., Approved Data Sheet & Specifications**	*** on 1% of total nos. of anodes**

4.	Spark Gap Arrestor (100 kA)	IW	Nos.				1,2,29	-	-	1,2,12	-	IWC	Manufacturer test certificates & Compliance Report	Approved Data Sheet & Specifications	
5.	Polarisation Cell (Solid State)	IW	Nos.				1,2,29	-	-	1,2,3,20, 35,36	1,2,3,20, 35,36*	IWC	Manufacturer test certificates & Compliance Report	Approved Data Sheet & Specifications	*50% quantity ** On one qty of each offered lot
6.	External ER Probe	IW	Set				1,2,29	-	-	1,2,12	1,2,12	IWC	D1, D3, D4, D5, D6, 20,12,13	Approved Data Sheet & Specifications	
7.	CTSU (Computerised Test Station Unit) & CTSU Reader	IW	Nos.				1,2,29	-	-	1,2,3,12 22,24	1,2,3,12 22,2	IWC	D1, D3, D4, D5, D6, 20,12,13	Approved Data Sheet & Specifications	
8.	Permanent Reference Cell	IW	Nos.				1,2,29	-	-	-	-	IWC	Manufacturer test certificates & Compliance Report	Approved Data Sheet & Specifications	
9.	TR/CPPSM UNIT	I	Set				1,2,3, 24, 27,28	-	-	1,2,3,12, *16,22,23 24,27,28	1,2,3,12, *16, 22, 23,24,27	IWC	D1, D2, D3, D4, D5, D6, 20 ,12,13	I.S., Approved Data Sheet & Specifications	16 Hr Heat Run Test on one no of each type unit
10.	MMO Anodes	I	Nos.				1,2,4, 29, 31	-	-	1,2,4, 29, 31	1,2,4, 29, 31	IWC	D1, D2, D3, D4, D5, D6, 20, 13	I.S., Approved Data Sheet & Specifications	
11.	CTSU (Computerised Test Station Unit), Central Monitoring server & CTSU Reader	IW	Nos.				1,2,3	-	-	1,2,3, 22,24,33	1,2,3, 22,24,33	IWC	D1, D3, D4, D5, D6, 20,12,13	Approved Data Sheet & Specifications	
12.	Anode Junction Box & Cathode Junction Box	IW	Nos.				1,2,3,4, 22, 29	-	-	1,2,3,4, 10,11 ,17*,22, 33	1,2,3,4, 10,11 ,17*,22, 33	IWC	D1, D3, D4, D5, D6, 20,12,13	Approved Data Sheet & Specifications	*Type test- Report review only

IW- Inspection waiver on basis of TPI IRN.
I-Inspection by MECON/Owner.

For MECON (Stamp & Signature)

for CONTRACTOR SUB-CONTRACTOR
(Stamp & Signature)

Q.A.P. NO.
MEC/05/E9/ E-0085/ QAP/082

SHEET 2 OF 2

REV. **0**

Annexure-II
to
Particular Job Specification
(CORROSION MONITORING SYSTEM WORKS)

TECHNICAL SPECIFICATION & SCOPE OF WORK FOR INTERNAL CORROSION MONITORING SYSTEM

INDRADHANUSH GAS GRID LIMITED

DULIAJAN FEEDER LINE (FROM CGGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)

DOCUMENT NO. - MEC/E0085/05/E9/E/CMS/001, R-0

(ELECTRICAL SECTION)
MECON LIMITED
DELHI 110 092

Document No.	Revision No.	Date
MEC/E0085/05/E9/E/CMS/001	R-A	29.06.2026

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1.0 INTRODUCTION

Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, GAIL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. As per Hydrocarbon Vision 2030 for North East India, North East Gas Grid (NEGG), a natural gas pipeline network, is being set up to connect the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni Guwahati Gas Pipeline. The project is being implemented in three phases based on the requirement of statutory clearance, route terrain, linkage with Highway corridor widening works, difficulty in work execution etc. for the development of a gas-based economy in North-Eastern India.

As per the mandate of the Cabinet Committee on Economic Affairs (CCEA), the NEGG is to connect all the eight Northeastern states to the National Gas Grid for the development of a gas-based economy in the Northeast in line with the Hydrocarbon Vision 2030 for the Northeast. It is also mandated by the CCEA to connect all the regional gas sources of the Northeast for early monetization of natural resources and to boost Exploration & production (E&P) activities in the region.

The natural gas pipeline grid would have the facility for injection of indigenously produced gases also. Connectivity from local marginal fields as well as source line/spur lines into North-East Gas Grid has been considered. The upstream source/ pipeline operator would make necessary arrangements for availability of requisite pressure at source for gas injection into the grid, as per the hydraulics.

M/s IGGL has awarded M/s MECON Limited as project management consultancy (PMC) services for proposed 24″NB X 176.120 Kms. (appx.) cross-country pipeline from Dispatch Terminal at CGGS Madhuban of OIL to existing SV-14 of GNPL at Jorhat-IGGL connectivity along with associated facilities. The Scope also includes a proposed 24″NB X 6.100 Kms. (appx.) cross-country pipeline from Dispatch facility at BCPL Lepetkata Plant to receiving (cum injection point) at Jokai Lepetkata along with associated facilities. The total proposed pipeline length is 24″ NB × 182.220 km (appx.). (Refer attached Schematic drawing) Salient features of the Project are as below:

Product: NG
Pipeline Size: 24”/6”
Pipeline Coating -3LPE
Refer table-1 for details of pipeline under this package.

In case of any conflict between the design basis &codes/ standards listed, the same shall be brought to the notice of Owner/Consultant for final decision, stringent of the same shall be followed without any additional time and cost to IGGL.

This document presents Scope of work for ICMS system for 3LPE Coated pipeline against corrosion. In case of any conflict between the codes and standards listed, the same shall be brought to the notice of Owner for final decision, which shall be binding.

In case of any conflict between the design basis, scope of work & codes/ standards listed, the same shall be brought to the notice of Owner/MECON for final decision, stringent of the same shall be followed without any additional time and cost to IGGL.

The pipeline throughput shall be as follows:

Pipeline	Location		Diameter/ Thickness	Approx. Length (Km)
	From	To		
DULIAJAN FEEDER LINE	Dispatch Terminal at CGGS Madhuban	SV-14 of GNPL	**24"**	**176.120 Kms (Approx.)**
Connectivity line	Dispatch facility at BCPL Lepetkata Plant	receiving (cum injection point) at Jokai Lepetkata	**24"**	**6.100 Kms (Approx.)**

1.1 Standards

1.1.1 The equipment/material shall be in conformity with this specifications, data sheet and code of practices of the relevant Bureau of India Standards, IEC & NACE publications. In case of any conflict, the stipulations under this specification/data sheet shall govern.

OISD STD: 188 (2019)	Corrosion Monitoring of Offshore & Onshore Pipelines
OISD-STD-105 (2004)	Work Permit System
NACE SP0206	Internal Corrosion Direct Assessment Methodology for Pipelines Carrying Normally Dry Natural Gas
NACE SP0208	Internal Corrosion Direct Assessment Methodology for Liquid Petroleum Pipelines
NACE SP0110	Wet Gas Internal Corrosion Direct Assessment Methodology for Pipelines
NACE SP0106	Control of Internal Corrosion in Steel Pipelines and Piping Systems
NACE SP0775	(Formerly RP0775) Preparation, Installation, Analysis, and Interpretation of Corrosion Coupons in Oilfield Operations
ASME B31.8 S	Pipeline Integrity Management System

PNGRB: Guideline's for Pipeline Integrity

OISD: Guidelines for Integrity Assessment of Cross-Country Pipelines

1.2 Site Conditions

The equipment offered and the installation shall be suitable for continuous operation under the following site conditions.

Ambient temperature	:	50°C/ 2˚C (max./min)
Max relative humidity	:	90%
Altitude	:	less than 1000 m
Atmosphere	:	To withstand site condition (Dust & High Temperature during summer and Low temperature during winter)

2.0 SCOPE

2.1 SCOPE OF DESIGN & ENGINEERING

2.1.1 Submission of design package, drawings, QAP (Quality assurance plan), data sheets, specification, equipment selection criteria, calculations & manuals for approval, various work procedures. Preparation of site engineering drawings, procedures and details for installation works wherever applicable or required by the Engineer-in-charge, and submits to the Engineer-in-charge for review and approval.

2.1.2 Correction, updating and submission of all Owner/MECON's drawings for as-built status.

2.2 LOCATIONS OF ER PROBE & CORROSION COUPONS

Refer P&IDs (Enclosed with Vol-IV of Bid Document) for the location of the ER Probe & Corrosion Coupons.

Location	Location/ Line No.	Fluid Flow	Pressure	Temp.	Thickness	Description of CMS
		M3/Hr	bar (g)	°C	mm	
CP & CC -1 No at DT, IP & RT station (Refer P&ID for final location), BCPL	Refer P&ID	Refer P&ID	Refer P&ID	Refer P&ID	Refer P&ID	a. Corrosion Probe b. Corrosion Transmitter c. Receiver (Corrosion Meter) d. Corrosion Coupon

Note: The above data is indicative only. The contractor shall get the necessary data from the Owner/MECON before placing the order to the manufacturer of CMS system.

- **The thickness of pipes mentioned in the above columns are tentative & the bidder shall confirm the thickness of the pipe from MECON where the installation of CMS system take**

place before the designing of the length & size of the ER probes, coupons & its fittings etc.

- **Corrosion coupon & Probes shall be installed at 6 O' Clock position, Spacing & Width, Length & Depth of pit shall be ensured accordingly for ease of retrieval of Coupons & Probes.**

- **The retrieval tool system shall provide online retrieval of data for corrosion monitoring. The access fitting shall permit the installation and removal of Coupon / Probe without the need for line shutdown. Corrosion Coupon and Probe shall be suitably insulated from the holder to prevent galvanic corrosion.**

- **Minimum separation distance between Corrosion Coupon & ER Probe shall be 1.5 times the pipeline diameter on which it is installed.**

2.3 SCOPE OF SUPPLY INSTALLATION, TESTING & COMMISSIONING

Following electrical equipment and material are in the contractor's scope of supply in this tender.
Supply, testing, Packing, Forwarding, Delivery, Installation and commissioning of all the equipment covered in this package are included in the scope of the contractor. No equipment will be free issued by the Owner/MECON to the contractor.

Design, detail engineering, FAT, supply of all materials, preservation at site/storage at site, fabrication, assembly, erection, installation, testing, commissioning, guarantee, performance evaluation/test at site with all safety & Personnel protective equipments (PPEs), trained personnel for installation, supervision & commissioning of corrosion monitoring system, submission of first trial/commissioning reports including preparation of operation manual, preparation of technical data sheet, training the client personnel, supply and installation of necessary software for conversion of the electrical resistance reading of the ER probes to corrosion rate in mills per year (mpy) and engineering drawings and obtaining approval from IGGL / MECON for Corrosion Monitoring System as per system description, drawing, specification, standards etc enclosed with the tender document and as per direction of Engineer-in-charge).

The ER/LPR probes and coupons shall be installed at suitable position on the pipeline as decided during the detail engineering. However, mandatory gap of 2.0 meters below the pipeline for retrieval of the ER/LPR probes and coupons is considered at installation locations, Bidder retrieval tool stroke length should be less than 2 mtr.

All the supplied items except panel shall be from a single manufacturer. Manufacturer's representative should be present at site for the installation, testing, commissioning, supervision, certification, performance evaluation of corrosion monitoring system and calibration work to be done at site.

Mandatory, O&M, Tools & Tackles for CMS system is in the contractor's scope of supply, List of Mandatory, O&M spares is enclosed with appendix-I & II will be supplied at IGGL's designated store.

All commissioning & start up spares are in bidder's scope (Included in this package). Any

commissioning & start up spare consumed during the start up & commissioning is included in the supply of this package, for which no extra payment is made.

2.3.1 **Execution Methodology**

Material Supply- All materials including spares, By Bidder.

Material Installation- All material of ICMS shall be installed by the Bidder except Access fitting installation and cable laying from transmitter to receiver (this work access fitting installation and cable laying shall be carried out by pipeline contractors under the supervision of the ICMS bidder).

Testing and commissioning of ICMS system- By Bidder

2.3.2 **MATERIALS AND SCOPE OF SUPPLY**

The scope of supply shall consist as minimum requirement of the following components:

i) ER PROBE, TRANSMITTER AND ACCESS FITTING ASSEMBLY FOR ER PROBES

a) ER Probe: Total Quantity = As per SOR.

ER Probes shall be high-pressure retrievable type flare weld, flush mounted, body in SS316 with element of carbon steel for installation with high-pressure hollow plug access fitting assembly. The probe shall be suitable for measurement of corrosion rate in the range of 0-10 mpy. The probe element shall be same as carbon steel of pipeline or API5L Grade B material and element thickness of 10 mils minimum.

Probe life shall be at least 2-3 yrs. at 1 to 2.5 mpy corrosion rate.

Probe length is to be decided by the Bidder as the pipe size varies from location to location.

Note- Thickness mentioned in SCOPE/ SOR is for bidding purpose only, Optimization of thickness of probe to be done to get higher sensitivity of measurement, Bidder shall furnish all design calculations for approval for selecting the size of probe. Accordingly, the suitable thickness probe shall be supplied.

Data sheet for ER probe-

Sl No	Description	Technical Data	Remarks
1	Pipeline Size & Material of Construction	24” Carbon Steel	
2	Wall thickness	As per P&ID	
3	Product Density & Viscosity	Refer P&ID	
4	Design Pressure	Refer P&ID	
5	Flow rate	Refer P&ID	
6	Operating pressure	Refer P&ID	

7	ER Probe type	Flush Mounting, Flare weld type	
8	Probe Element	Same as carbon steel of pipeline or API5L Grade B	
9	Element Thickens	10 Mills	
10	Nos of Probe and spare probe	As per SOR	
11	ER Probe Tag no.	ER-01, ER-02	
12	Design Temperature	-29 to 65 deg C	
13	Pressure Rating- Probe & Accessories	3600 PSI	
14	Mounting	Access fitting, Flush mounting	
15	Mounting position	6 O Clock	
16	Probe Length	Shall be provided by the Bidder	
17	Probe Material	SS 316L	

b) Transmitter: As per SOR.

Yoke Mounted Transmitters with cover in field -The transmitter shall be yoke mounted with cover. All transmitters shall be provided with external surge / Transient arrester (PESO certified). The transmitter shall have valid intrinsically safety certificate from authorized certifying agency (ATEX/CIMFR and PESO Certificate) for use in Hazardous area (Zone 1 &2, Gr. IIA/B T3) as specified in design basis. All transmitters and probes shall be provided with Ni platted brass, double compression type, Ex-d and PESO certified cable glands.

Type – 2 wire
Min IP-66
Input- ER probe
Output- 4-20 mA
Cable lead- 5' for ER probe connection and required length for connection to receiver (corrosion meter in control room) from transmitter.
Power Supply-24 VDC from receiver unit
Mounting-At site near probe by bracket/ yoke support
-Intrinsically safe for Hazardous area specified in area classification
-With safety barrier between transmitter and receiver.

Data sheet for Transmitter-

Sl No	Description	Technical Data	Remarks
1	Mounting	Indirect mounting in the yoke	
2	Type	2-wire	
3	Cable lead	5-feet for ER prove	
4	Glands & Lugs	Glands- FLP type, in scope of Bidder	
5	Hazardous area certification	ATEX/CIMFR and PESO Certified Class-1 & 2, Div 1, Grp B C & D (Zone 1 & 2, Gr. IIA/B T3), IP-66	
6	External surge arrestor	Shall be provided, CIMFR approved & PESO certified	
7	Transmitter Tag no.	TR-01, TR-02	

8	Design Temperature	-29 to 65 deg C	
9	Power supply	24V DC+/- 1 V, Loop powered	
10	Communication data	4-20mA	
11	Name Plate	SS 316	
12	Body Material	AL/ SS	

c) Access Fitting Assembly for ER Probe –Total Quantity: As per SOR.

The access fitting shall be of flare weld Access Fitting Assembly (non-tee), body carbon steel, and acme thread outlet with hollow-plug assembly in AISI-316L along with heavy duty protective C.S. cover complete with essential spares. Rating 6000 psi and suitable up to design temperature of -29 to 65 deg C.

Access fitting cover - Heavy Duty Without Hole (Material to be specified by Bidder)

The access fitting should have rust free design and less chances of damage of threads (thread protection shall also be provided) and should be designed as per the operational & other data collected in site visit.

All the offered Access fittings should be compatible for insertion of ER Probe/Corrosion Coupon made by other manufacturers.

CERTIFICATE: BS EN 10204 TYPE 3.2 - PRESSURE CONTAINING PARTS. Access fitting shall be tested for dye penetrant inspection of forging according to ASME V article 6- 100%

Data Sheet for Access Fitting Assembly (ER probes)-

Sl No	Description	Technical Data	Remarks
1	Pipeline Size & Material of Construction	24” Carbon Steel	
2	Corrosion Allowance,	0.5 mm	
3	Product Density & Viscosity	Refer P&ID	
4	Wall thickness	Refer P&ID	
5	Design Pressure	Refer P&ID	
6	Flow rate	Refer P&ID	
7	Operating pressure	Refer P&ID	
8	Access fitting mounting	On pipe, Flare weld type, non tee, 2” system	
9	Access fitting height	5.25”	
10	Plug type	Hollow type, SS316L	
11	Cover	CS heavy duty with hole	
12	Nos of Access Fittings	As per SOR	
13	Access fitting Tag no.	AFER-01, AFER-02	
14	Design Temperature	-29 to 65 deg C	
15	Pressure Rating	6000 PSI	
16	Mounting	Access fitting, Flush mounting	

17	Mounting position	6 O Clock, Retrievable	

Note- Access fittings and its accessories if fails during Post welding hydrostatic test of installation of CP & CC access fittings & accessories, Bidder shall relace the access fittings & accessories with out any price implication to the IGGL.

ii) CORROSION COUPONS:

a) **Corrosion Coupon:** The corrosion coupons shall be mild Steel flush disc coupons 1.25" dia. x 1/8" thickness with one mounting hole of ID 0.312"- The corrosion coupon shall be made of same pipeline material or API5L Grade B material. The corrosion coupon would be replaced in every 180 days, after exposure to the fluid in the pipeline. Bidder to provide chemical composition certificates of coupon. (PMI)

b) **Coupon Holder**: Installation locations as mentioned above. The coupon holder shall be retrievable type made of SS 316L.

c) **Access Fitting Assembly for Corrosion Coupons** –Total Quantity As per SOR.

The access fitting shall be of flare weld Access Fitting Assembly (non-tee), body carbon steel, and acme thread outlet with solid plug assembly in AISI-316, along with heavy duty protective C.S. cover complete with essential spares. Rating 6000 psi and suitable up to design temperature of -29 to 65 deg C.

The access fitting should have rust free design and less chances of damage of threads (thread protection shall also be provided) and should be designed as per the operational & other data collected in site visit.

All the offered Access fittings should be compatible for insertion of ER Probe / Corrosion Coupon made by other manufacturers.

Data Sheet for Access Fitting Assembly (Corrosion coupons)-

Sl No	Description	Technical Data	Remarks
1	Pipeline Size & Material of Construction	24" Carbon Steel	
2	Corrosion Allowance,	0.5 mm	
3	Product Density & Viscosity	Refer P&ID	
4	Wall thickness	Refer P&ID	
5	Design Pressure	Refer P&ID	
6	Flow rate	Refer P&ID	
7	Operating pressure	Refer P&ID	
8	Access fitting mounting	On pipe, Flare weld type, non-tee, 2" system	
9	Access fitting height	5.25"	
10	Plug type	Solid type, SS316L	

11	Cover	CS heavy duty without hole	
12	Nos of Access Fittings	As per SOR	
13	Access fitting Tag no.	AFC-01, AFC-02	
14	Design Temperature	-29 to 65 deg C	
15	Pressure Rating	6000 PSI	
16	Mounting	Access fitting, Flush mounting	
17	Mounting position	6 O Clock, Retrievable	
18	Coupon Holder	SS316L, Flush mounting	
19	Holder length	Submitted by Bidder for approval.	

iii) RECEIVER (CORROSION METER)- Receiver for ER probes shall be installed in the vendor supplied MS panel (Instrumentation panel).

Specification of Corrosion receiver-

- Resolution: ±0.01 mpy or better
- Measurement repeatability: ± 1 dial division
- Measurement range: 0-10 mpy
- Design Temperature -29ºC to 65ºC
- Complete with suitable safety barrier & surge arrestor with all internal wiring & operation and maintenance manual.
  Receiver (corrosion meter) shall be installed in the control room in bidder supplied panel.
- Power supply details- 220V AC through UPS (02- Independent feeders),
- The unit shall be suitable to provide 24VDC supply for powering the transmitter is 4-20 mA loop through the two-wire cable.
- The unit shall receive 4-20 mA signal proportional to corrosion rate in mils per year (MPY) from the transmitter through the same two-wire cable and provide digital display of corrosion rate through the same two-wire cable. 4-20 mA signals shall also be available from the receiver (corrosion meter) for interfacing with DCS/SCADA.
- Also, it shall have Ethernet port for interfacing / communicating with station PLC or SCADA RTU over Modbus TCIP/IP protocol for fetching all the parameters and diagnostics.
- Have feature to download all logged data in disk/ Memory drives.
- The receiver unit (Display unit for CMS system) shall be installed inside the pipeline control room in Bidder supplied panel including pre wiring, complete software's & hardware's for ICMS system.

iv) RETRIEVER KIT-

Complete with repair and seal kit for ER probes & coupon holders – **Rating: 3600 psi.**

The retriever shall be manufactured from stainless steel and should have chromium plating for resistance to mechanical / corrosion damage at high pressure. Retriever, shall works on a pressure-balanced principle i.e., sudden released of pressure from the system, the retriever will not telescope.

v) SERVICE VALVE KIT- Rating: 3600 psi.

Service valve kit, complete with blanking plug, extension lever, and brass hammer, spare face-to-access fitting O-ring, heavy duty field service box, essential repair & seal kit.

Retriever & service valve kit shall be designed for operation on all locations for ER probe and coupons.

Bidder will carry out hydro-test, at Manufacturer's works prior to dispatch, on all supplied service valve and retriever tools at 1.5 times of rated pressure for duration of min. 30 minutes and above. & the same shall be witnessed by IGGL/MECON/TPI. Service valve shall be fire safe confirming to API 607.

vi) Access fitting assembly for ER Probes & Coupons, Retriever tool & Service Valve Hydrotest Certification:

Bidder will carry out hydrotest on all supplied service valve and retriever tools with maximum pressure of 150% of highest operating pressure where the retriever tool and service valve will be used for duration of min. 30 minutes and above.

Bidder will carry out hydro-test, at Manufacturer's works prior to dispatch, on all supplied service valve and retriever tools at 1.5 times of rated pressure for duration of min. 30 minutes and above. & the same shall be witnessed by IGGL/MECON/TPI.

vii) Cables for ER Probe –Transmitter/Off line data logger:

All ER Probes must be supplied with minimum 5 meters length Cable for Connecting to Hand Held Data Logger/Transmitter/Off line data logger. The Cable must have the required connectors for connecting the ER Probe at one end & Hand-Held Data Logger/Transmitter/Off line data logger at the other end.

viii) Interchangeability of Coupon and Probe holders w.r.t. access fittings

It is must that the designed access fittings, coupons & Probe holders can be used with probes of other manufacture's as mentioned in the vendor list. Interchangeability must be guaranteed w.r.t. Probe & Coupon holders, Probes, Coupons and access fittings.

Similarly, it should be applicable to service valves, online retrieval kit, corrosion data logger, online corrosion meters and hand-held meters.

ix) All CMS equipment shall be supplied from the List of Preferred makes. In the interest of standardization, the Employer reserves the right of selecting particular manufacturer of CMS items and materials and the Bidder shall supply equipment and materials of the particular make, if so required.

3.0 MATERIAL SPECIFICATION

Technical Requirements

The electrical resistance (ER) probes and corrosion coupons to be installed at the location as mentioned above shall be retrievable from the line under the operating pressure and temperature. The ER probes & coupons shall be flush mounted on the pipeline at suitable

position. All the materials in contact with fluid shall be in accordance with NACE Standard MR-0175. Pipeline inlet pressure may vary according to pipeline pressure drop due to different flow rate, the corrosion monitoring system shall be suitable for operation under this fluctuating pressure conditions.

4.0 INSPECTION AND TESTING

4.1 **All the equipment supplied by the contractor shall be inspected by the Owner/MECON and/or their inspection agency at the manufacturer's works prior to despatch. The equipment will be inspected as per the tests pre-identified in the approved QAP to ensure conformity of the same with relevant approved drawings, data sheets, specifications, National/International standards.**

Following Inspection and testing documents are required prior installation of the access fittings, ICMS bidder shall ensure these documents from Laying & Composite contractor prior to installation of

Documents required prior to Fabrication or Testing (Ensured by the Bidder prior to start of installation of access fittings under supervision of Bidder):

1. Weld Location Plans (Part of individual fabrication drawings)
2. Weld Procedure Specifications (WPS) & Qualifications (WPQ) Records
3. Non-Destructive Examinations (NDE)
4. Forming & Heat Treatment Procedures (Inc. PWHT)
5. Hydrostatic Test Procedures
6. PMI Test Procedures (steels other than carbon steel)
7. Seal Test Procedure at Manufacturers works
8. Performance/Optional test Procedure
9. Factory Acceptance Test Procedures
10. Weld Procedure Specification (WPS)

Documents required after completion of installation of access fittings –

1. Welder Performance Qualification Certificates
2. NDE Operator Qualifications
3. Production Test Results (Including Welding)
4. Heat Treatment Records
5. NDE Records
6. Material Traceability Records
7. Calibration Certificates
8. Pressure Test Certificates
9. Dimensional Reports
10. Supplier Certificate of Compliance
11. Technical Operating and Maintenance Manual

4.2 **Performance test for CMS system**

Bidder shall carry out performance test of CMS system after completion of the installation & commissioning. The PG test to be demonstrated to Client / Client's representative to ensure the correctness of the installed system. If the system

performance fails during PG test the whole system will be rejected and all equipments installed shall be either re-designed/modified is in the scope of the Bidder.

The performance evaluation of corrosion monitoring system during commissioning shall be calibrated as per manufacturer's instruction for a period required for a complete cycle of parcel of materials being transported such as crude oil in the pipeline. The contractor shall record and tabulate the corrosion rates at known location of pipelines and submit to owner/MECON along with their comments. The CMS system generated data should not vary over abnormally wide range. CPBG (Contractor's, Performance, Bank Guarantee) shall be released based on performance evaluation.

Performance tests of any equipment which cannot be conducted/ demonstrated either partially of wholly at the manufacturer's work, shall be conducted after erection at site in the presence of Owner/MECON & their inspection agency. In all the cases, prior approval of the approval shall be obtained.

4.3 In case of waiver category of items, the same shall be pre identified. For such items, the contractor shall furnish necessary certificates, test reports etc for Review/Approval to Owner/Inspection agency. The issue of Inspection Certificate/Waiver Certificate for any equipment or component there of does not absolve the contractor from his contractual obligations towards subsequent satisfactory performance of the equipment at site. Should any equipment be found defective, In whole or part thereof after receipt at site or during erection/commissioning and testing shall be Rectified/Changed by contractor free of cost.

4.4 In case of waiver category of items, the manufacturer shall carry out stage wise inspection and testing as per relevant standard codes and service requirements of the specification, for all items of his work prior to shipment. The Manufacturer/contractor shall submit stage wise inspection documents for review/Approval to the Owner/MECON. Manufacturer's third party inspector's test certificates for finished items in printed format must be sent with the despatch paper of all supply items.

4.5 Contractor shall submit test plan for the equipment with four-week advance notice.

5.0 PAINTING, MARKING & SHIPMENT

5.1 All items shall be painted and marked as per manufacturer's standard before shipment. All items shall be properly packed and protected to avoid damage during shipment. The manufacturer shall ensure insurance during shipment. If any equipment found defective, In whole or part thereof after receipt at site or during shipment/erection/commissioning and testing shall be rectified/changed/supplied by contractor free of cost.

6.0 SPARE & ACCESSORIES

The bidder shall supply recommended spares and accessories for 2 years operation as per list of 2 Year O&M spares along with bid (Annexure-II). Any additional spare are required shall be intimated during the design approval and shall be supplied at extra cost with the O&M spares.

7.0 GUARANTEE / WARRANTEE

7.1 The contractor shall guarantee the installation against any defects of workmanship and

materials (supplied by the contractor) for a period of 12 months after successful commissioning at site. Any damage or defects connected with the supplied material, erection of materials, equipments, fittings, meters supplied by the contractor that may be undiscovered during Defect liability period, or may arise or come to light thereafter, shall be rectified or replaced by the contractor at his own expense as deemed necessary and as per the instruction of the Engineer-in-charge within the time limit specified by Engineer-in-charge.

7.2 The above guarantee shall be applicable for the quality of work executed as well as for the equipment/ cable/ fittings/meters/software's/hardware's other materials etc supplied by the contractor.

8.0 IN WARRENTY & POST WARRANTY ICMS SCOPE OF WORK (5-YEAR N-CAMC FOR ICMS SYSTEM)

kindly refer annexure- IX for scope matric and scope of work for Corrosion monitoring work during the warranty / DLP period and during 5-YEAR N-CAMC of ICMS system (after 12 Months Guarantee/ DLP of contract).

9.0 OTHER MISCELLANEOUS WORKS

i) The job includes any mechanical works including panel mounting erection work including material, base channels, welding etc. required for completeness of job.

ii) Checking of all connections, i.e. power, control, signal, earthing including testing & loop checking under instructions of Engineer-in-Charge.

iii) Supply and installation of all other accessories not specifically mentioned herein but nevertheless necessary for completion of job.

iv) Engineering and preparation of specifications, data sheets, procedures and drawings etc required for procurement & installation of ICMS System wherever applicable/required by Owner/ MECON and submit to Owner/ MECON for approval/comments.

v) Correction and submission of all owners' drawings for as-built status.

vi) Obtaining clearance for energizing the complete electrical facilities covered under this tender and approval of installation/drawings from Govt. authority if required.

vii) Test certificates, catalogues, vendor drawings, installation, operation and maintenance manuals for all equipment/materials in contractor's scope of supply.

viii) **All Mechanical work related to the ICMS work is in scope of Bidder except ICMS cable laying from the transmitter to receiver and installation of access fittings including welding & testing. Supervision of installation, testing, welding of access fitting & cable laying & termination is in the scope of the ICMS bidder.**

ix) Co-ordination with other Contractors.

10.0 AREA CLASSIFICATION

Hydrocarbon handling areas have been generally classified as zone 1 & 2, gas group IIA/IIB as per IS: 5572, API RP-500, OISD - 113 and IP Rules. All equipment to be installed in these areas shall be suitable for the area classification with temperature class T3 (200˚C), CMRI testing and approved by CCOE, DGFAS and having PESO approval/ license.

11.0 JOB SPECIFICAITONS

a) The electrical resistance (ER) probes and corrosion coupons to be installed at the location as mentioned above shall be retrievable from the line under the operating pressure and temperature. The ER probes & coupons shall be mounted on the pipeline at suitable position. All the materials in contact with fluid shall be in accordance with NACE Standard MR-0175. Pipeline inlet pressure may vary according to pipeline pressure drop due to different flow rate; the corrosion monitoring system shall be suitable for operation under this fluctuating pressure conditions.

b) Various works covered under this contract like equipment erection, welding, mechanical work, cabling and grounding works etc shall be performed in accordance with applicable specifications / standard practice.

c) The equipments/materials to be supplied by the contractor shall conform to the requirements of the applicable specifications enclosed in the tender document.

d) Price of erection & commissioning spares and special tools shall be included in the quoted price by the bidder.

e) The above location & no of ER probes, corrosion coupons, Transmitters & Receivers, Service valve kit, Access Fitting Assembly for probe & coupon, Retriever Kit etc is indicative (Only for tender purpose), actual no. of these equipments & their location may change according to site condition/in detail engineering, Contractor shall provide these changed no. of quantities as per unit price quoted in SOR.

12.0 MAKES OF EQUIPMENTS AND MATERIALS

Suggested vendor list for CMS system enclosed with this specification. (**See annexure-III**) All the components & accessories including spares shall be supplied from a single manufacturer for management in future.

13.0 SOFTWARES & HARDWARES

Bidder will supply and install all necessary software's and hardware's required for operation, data collection, data storage & downloading to Personal computers from hand held meters and should have features of data analysis, historical data storage & review, report generation etc.

All the software's will be provided in CD's/Pen-drive with valid key and 02 user licences (Installed 02 nos. of Computers provided by IGGL) and have free updates for future.

14.0 TRAINING

Successful bidder will provide classroom training as well as field training at least of 2 Man days at R/T of M/s IGGL. The training will broadly consist of operation of ICMS system, its working,

retrieval of coupons & probes, Collection of corrosion related data, data analysis & assessment, learning & operation of all software's and hardware's provided. The trainer will have vast experience in corrosion monitoring field and corrosion data analysis and preferably from the supplier of the ICMS system.

15.0 RESOURCES FACILITIES

15.1 Construction Water, Air and Power Supply

No water, Air and power will be provided by the Owner/MECON. It should be the responsibilities of the contractor to arrange water and power at his own cost.

15.2 Land for Residential Accommodation

Owner/MECON shall not provide any land for residential accommodation of contractor's staff and labour.

16.0 PROJECT SCHEDULING & MONITORING

The following schedules/documents/reports shall be prepared and submitted by the Bidder/Contractor for review/approval at various stages of the contract.

16.1 Along with Bid

f) Time Schedule

The Completion Time Schedule for the work (including mobilization period) as given in VOL-I of in all respect, from the date of issue of letter/Fax of Intent.

The Bidder is required to submit a Project Time Schedule in Bar Chart Form, along with the Bid. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner/MECON interface activities shall be clearly identified with their latest required dates. Owner/MECON reserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line with the overall Project requirement.

g) Scheduling & Monitoring System

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package and sample outputs.

16.2 After the Award of Contract

a) Overall Project Schedule

The Contractor shall submit within 1 week of Fax of Intent, a sufficiently detailed overall Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.

The network will be reviewed and approved by Engineer- in-Charge and the comments if any shall

be incorporated in the network before issuing the same for implementation. The network thus finalised shall form part of the contract document and the same shall not be revised without the prior permission from Engineer-in- Charge during the entire period of contract.

b) Progress Measurement Methodology

The contractor is required to submit within 1 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/ delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner/MECON reserves the right to modify the methodology in part or in full.

c) Functional Schedules

The contractor should prepare detailed functional schedules in line with network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and construction.

16.3 **Project Review Meetings**

The Contractor shall present the programme and status at various review meetings as required.

Weekly Review Meeting

Level of Participation	:	Contractor's/MECON's RCM/ Site Incharge & Job Engineers.
Agenda	:	a) Weekly programme v/s actual achieved in the past week & programme for next week. b) Remedial Actions and hold up analysis. c) Client query/ approval.
Venue	:	Site Office

Monthly Review Meeting

Level of	:	Senior Officers of IGGL/MECON and Participating Contractors.
Agenda	:	a) Progress Status/ Statistics b) Completion Outlook c) Major hold ups/slippages d) Assistance required e) Critical issues f) Client query/ approval
Venue	:	IGGL/MECON Office/ Site Office

16.4 **Progress Reporting Performa**

A) Monthly Progress Report

This report shall be submitted on a monthly basis within 10(ten) calendar days from cut-off date, as agreed upon covering overall scenarios of the work. The report shall include, but not limited to the following:

- Brief Introduction of the work.
- Activities executed/ achievements during the month.
- Schedule versus actual percentage progress and progress curves for Detail Engg. Sub-ordering, Manufacturing/ Delivery, Sub-contracting, Construction, Commissioning and Overall and quantum wise status & purchase orders against schedule.
- Area of concern/ problem/ hold-ups, impacts and action plans.
- Resources deployment status.
- Annexures giving status summary for drawings, MRs, deliveries, sub-contracting and construction.
- Procurement status for items to be supplied by Contractor.

B) Weekly Reports

The report will be prepared and submitted by the Contractor on weekly basis and will cover following items:

- Activities programmed and completed during the week.
- Resource deployed men and machines.
- Quantities achieved against target in construction
- Record of Mandays lost.
- Construction percentage progress schedule and actual.

C) Daily Repots

- Activity programme for the day
- Progress of the previous day and commutative progress.
- Manpower & machinery deployed.

Successful bidder shall submit DPR (Daily progress report) & Monthly Monitoring Report to the owner/MECON as per the format in Annexure-IV.

16.5 **Progress Reports**

16.5.1 CONTRACTOR shall make every effort to keep the OWNER/MECON adequately informed as to the progress of the WORK throughout the CONTRACT period.

CONTRACTOR shall keep the OWNER/MECON informed well in advance of the construction schedule so as to permit the OWNER/MECON to arrange for requisite inspection to be carried out in such a manner as to minimize interference with progress of WORK. It is imperative that close coordination be maintained with the OWNER/MECON during all phases of WORK.

16.5.2 By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER/MECON a detailed report covering the progress as of the last day of the previous month. These reports will indicate actual and scheduled percentage of completion of construction as well as general comments of

interest or the progress of various phases of the WORK. The frequency of progress reporting by the CONTRACTOR shall be weekly.

16.5.3 Once a week, CONTRACTOR shall submit a summary of the WORK accomplished during the preceding week in form of percentage completion of the various phases of the WORK, to the OWNER/MECON.

16.5.4 Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs, test certificate etc. Such progress reports shall be in the form and size as may be required by the OWNER/MECON and shall be submitted in at least 3 (three) copies.

16.5.5 Contractor shall prepare daily progress report (DPR) in the desired format and submit it to Engineer-in-charge alongwith schedule of next day to Engineer-in-charge.

16.6 Construction Aids, Equipment, Tools & Tackles

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction equipment, Special Aids, Cranes, Tools, Tackles and testing equipment and appliances. Such construction equipment etc. shall be subject to examination by Owner/MECON and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER/MECON shall be immediately got rectified, repaired or the equipment replaced altogether, by CONTRACTOR. OWNER/MECON shall not in any way be responsible for providing any such equipment, machinery, tools and tackles.

The OWNER/MECON reserves the right to rearrange such deployment depending upon the progress and priority of work in various sections.

16.7 ORDER OF WORKS/PERMISSIONS/RIGHT OF ENTRY/CARE OF EXISTING SERVICES

The order in which the WORK shall be carried out shall be subject to the approval of the Engineer-in-charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently.

OWNER/MECON reserves right to fix up priorities which will be conveyed by Engineer-in-Charge and the CONTRACTOR shall plan and execute work accordingly.

It is responsibility of bidder to generate the request for work permit prior to start of survey, installation, commissioning & monitoring works at locations mentioned, Permission & work permit will be provided by M/s IGGL.

17.0 INSPECTION OF SUPPLY ITEMS

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner/ MECON in writing at least 10 days in advance of the date of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ MECON. All costs towards testing, third party inspection etc. shall be borne by the contractor within their quoted rates. All inspection of various items shall be carried out based on Quality Assurance Plan, which will be submitted by the Contractor and duly approved by Owner/MECON.

18.0 ESCALATION

The Rates quoted shall be kept firm till completion of work and no price Escalation shall be paid.

19.0 DOCUMENTATION

19.1 Drawings and design documents

19.1.1 **Along with Bid**: The following documents shall be submitted along with the offer:

a) No deviation certificate.
b) Compliance to Technical Bid (CMS System)- Annexure-II
c) Catalogues for various equipment in CMS system

19.1.2 **After award of Bid:** The following drawings (in three sets) & documents shall be submitted for approval during detail engineering award of contract-

a) CMS equipment data sheets including **General Arrangement and Cross Sectional Drawings to be provided which include Dimensions, Weights & Material Specification of all parts.**
b) **ISO 9001 Certificate or Quality Manual (Include certificates for major sub-suppliers).**
c) **Engineering / Fabrication / Production schedule including bar chart**
d) Procedures for installation, testing & commissioning of CMS system.
e) Equipment selection criteria & drawings along with Detail engineering package of CMS system for approval includes selection criteria of equipment (fittings, holders, probes, coupons etc), thickness calculation of probes and coupons, location of installation, IL calculations & selection of measurement instrument.
f) Data sheets of all component of CMS system.
g) **Bill of Materials including spares**
h) CVs of personnel involved as per organogram.
i) Procedures, drawings for installation, testing & commissioning of CMS system includes procedures for welding, installation of equipment, retrieval etc including **Pre-Commissioning / Commissioning Procedures**
j) **Preparation for Shipping with Handling & Storage Procedures; Packing and Shipping Schedule; Hazardous Material Shipping Certificate**
k) QAP (Quality assurance plan).
l) List of two years operation and maintenance spare.
m) O&M manuals of various equipment of CMS system

19.1.3 **During N-CAMC**:

The following documents shall be submitted within 15 days after completion of corrosion monitoring as per N-CAMC scope of work-

a) Health status of service valve and retravels & preventive maintenance reports.
b) Preventive maintenance reports of access fittings, holders, meters & receivers.
c) Annual calibration of transmitter & receivers' schedule/status.

d) Corrosion rate analysis from Corrosion coupons and probes of complete pipeline.
e) Updating data on the corrosion database management of corrosion coupons and probes of all locations.
f) Corrosion inhibitor dosing recommendations for next 06 months.
g) Reports of internal corrosion monitoring, analysis and corrosion rates & recommendations duly certified from NACE Corrosion specialist.

20.0 DRAWINGS AND DATA SHEET

20.1 Contractor shall submit drawings and data sheet as enumerated in this specification of the equipment / materials to be supplied.

20.2 After the job completion, contractor shall prepare AS-BUILT drawings and documents, submit catalogues/manuals (O&M), datasheets, test certificates of major brought out items like Transmitter & receiver, Service valve kit, Retriever service valve, Access fittings, service valve kit etc of CMS system. Final certified as built drawings, documents and manuals etc shall be submitted by the contractor to Owner/MECON in bound volume with three set in soft copy (Pen drive) plus two sets of prints to IGGL plus one set of soft copy to MECON.

Other drawings and documents shall be submitted by contractor along with AS-BUILT Drawings/Datasheets-

a) All approved design & detail engineering documents.
b) Test documents & drawings for bought out items
c) Guarantee / Warranty certificates.
d) Installation, testing & commissioning reports of CMS system

-x-x-x-

Annexure-I

List of Spares for 02 Yrs O&M		
Sr. no.	Item Description	Quantity
1	SS316 Solid Plug	02 No.
2	SS316 Hollow Plug	02 No.
3	Hollow Plug Seal Kit (1 Packet contains 10 Nos. of Primary	04 Set

	Packing, 10 Nos. Probe Packing O-Ring & 10 no. Of each type of sealing ring/gaskit)	
4	Solid Plug Seal Kit (1 packet contain 10 nos. of Primary Packing, 10 nos. of Viton packing O-Ring & 10 no. Of each type of sealing ring/gaskit)	04 Set
5	Retrieval Seal Kit (1 set consist of 2 nos. Of each type seal)	02 Set
6	Service valve Seal Kit (1 set consist of 2 nos. Of each type seal)	02 Set
7	Flush disc coupon holder	02 nos.
8	ER probe holder	02 nos.
9	Allen key set	02 nos.
10	Tool box set-Normal (Taparia make or equivalent)	01 no. consist of following tools- Adjustable Spanner (Suitable for ICMS system) Pliers 1 no. 6”, Screw Driver set 1 no. Line Tester 01 no., Hammer & Soft (Nylon) Hammer 01 no. each Double Ended Spanner Set 01 no. Hacksaw with Blades 01 no. Pipe wrench 01 no., Wire Cutter 01 no.
11	Tool box set- non-Sparking	01 no. consist of following tools - Adjustable Hook Spanner (For Access fitting) 01 no. Adjustable Spanner 01 no. Hammer 01 no. Pipe wrench 01 no.

List of Mandatory Spares

Sr. no.	Item Description	Quantity
1	SS316 Solid Plug	10 Nos. (2/ station)
2	Solid Plug Seal Kit (1 packet contain 10 nos. of Primary Packing, 10 nos. of Viton packing O-Ring & 10 no. Of each type of	10 Nos. (2/ station)

	sealing ring/ gaskit)	
3	Retrieval Seal Kit (1 set consist of 2 nos. Of each type seal)	02 Set
4	Service valve Seal Kit (1 set consist of 2 nos. Of each type seal)	02 Set
5	Flush disc coupon holder	10 Nos. (2/ station)
6	ER probe holder	04 nos.
7	Allen key set	02 nos.
8	Corrosion Meter/ receiver	01 no
9	Transmitter (along with 5m Cable for connection from Probe to Transmitter)	01 no

Price of Mandatory spares are inclusive of the total supply price of ICMS package, no extra price shall be paid for the Mandatory spares.

Annexure-II

Compliance to Technical Bid (CMS System)

Sl No.	Tender Clause No.	Description	Documents Required for Qualification (Technical Part of Bid)/ Bidder's Compliance/Bidder's Confirmation	Submitted in E-Bid (Bidder to Indicate Yes/No)	Reference In E-Bid Document (Bidder to indicate Place, Page No. /Vol No. In

					the Bid)
1	-	Technical Compliance to the complete scope of work	Bidder shall furnish "No Deviation Certificate". Deviation if any, due to of change/amendment/revision in design code (vendor specific) shall not be considered at this stage and subjected to review/approval of Client/MECON. (For the acceptance of the deviation in the design code suitable justification is required during detail engineering).	**Yes**	
2	-	Confirm No Deviation in Technical Bid.	Confirm (Offer may be rejected if there is any deviation).	**Yes**	
3	Installation, mechanical work, Commissioning & Start-Up spares	All the spares required for Installation, Commissioning & Start-Up of the ICMS system shall be included in the scope of the bidder, any spares required permanently for the Installation, Commissioning & Start-Up of the ICMS system the same shall be supplied free of cost.	Confirm.	**Yes**	
4		All the required documents are enclosed with the bid document as per the clause.	Confirm.	**Yes**	
5	BOQ/BOM	BOQ/BOM shall be prepared by bidder and shall be reviewed & approved by MECON during the detail engineering stage & approval of	Confirm.	Required during detail engineering	

		ICMS package.			
6	List of Unique Serial no./ Part No./Identification no. of product/sub product and Parts of offered system.	Bidder shall submit list of Unique Serial no./ Part No./Identification no. of product/sub product and Parts of offered system & spare parts with unpriced bid.	List with unpriced bid.	Required during detail engineering	
7	SME-Subject Matter Expert	Confirm that Corrosion monitoring and Corrosion rate, remaining life assessment reports of each pipeline shall be certified by NACE Certified Corrosion Specialist/Sr Corrosion technologist (SME-subject matter expert) and shall be as per NACE requirements as mentioned in standards including desktop study, visit at site is also includes, if required. SME shall have experience of more than ten (10) year in conducting corrosion rate monitoring & assessment, Corrosion data analysis, remaining life assessment.	Confirm.	**Yes**	

8	Letter of association from OEM & undertaking for the support & spare for design life of the pipeline.	Letter of association from OEM is required to be submitted along with bid having information of bidder's association with OEM and confirmation from OEM that OEM will provides services like repair of supplied equipment, retrieval kit, service valve, meters/data loggers etc including supply of spares parts required, supply of similar equipment in future as required by the Owner up to design life of the equipment including spare availability.	Association & Confirmation letter from OEM.	**Yes**	

Annexure-III

OEM LIST FOR CORROSION COUPON & ER PROBE ASSEMBLY

The corrosion monitoring items shall be procured from one of the following manufactures:

1) Rohrback Cosasco System

2) Metal Sapmples
3) Teledyne Cormon Ltd, UK
4) Caproco International Ltd
5) PT korosi Specindo

Note: All the components including spares shall be purchased from a single manufacturer.

Note-1: -

1) For any other item(s) for which the vendor list is not provided, bidders can supply those item(s) from vendors/ suppliers who have earlier supplied same item(s) for the intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supply range.

The bidder is not required to enclose documentary evidences (3 nos PO copies with completion certificates, Inspection Certificate etc.) along with their offer, however in case of successful bidder, these documents shall require to be submitted by them within 30 days from date of Placement of Order for approval to IGGL/ MECON.

2) The details of vendors indicated in this list are based on the information available with MECON. Contractor shall verify capabilities of each vendor for producing the required quantity. PMC does not guarantee any responsibility on the performance of the vendor. It is the contractor's responsibility to verify the correct status of vendor and quality control of each party and also to expedite the material in time.

Note-2 - Item/Vendor, which are not listed above, shall be subject to prior approval from Client/Consultant.

For procuring bought out items from vendors other than those listed above, the same may be acceptable subject to the following: -

a) The vendor/ supplier of bought out item(s) is a manufacturer/ supplier of said item(s) for intended services and the sizes being offered is in their regular manufacturing/ supply range along with satisfactory performance certificate of last 01 year.

b) The vendor / supplier should not be in the Holiday list of MECON/ MECON / other PSU.

The bidder should enclose documentary evidences i.e. 3 nos PO copies & completion certificates, Inspection Certificate etc. for the above, along with their bids.

Annexure-IV

Format for Monitoring of Corrosion Rate (ER Probe)

Sr. No	Date	Location	Region	Corrosion rate (By	Corrosion rate	Installation check	Pipeline Operating	Other Readings	Remarks

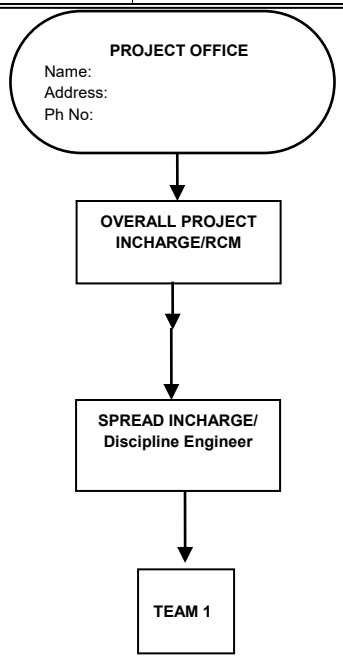
				Handheld meter) mpy	(Online Meter) mpy		Pressure	(If Any)	
				Current reading					

Format for Monitoring of Corrosion Rate (Corrosion Coupons)

Sr. No	Date	Location	Region	Laboratory Analysis & Report	Retrieval of coupons (By service valve & retrieval kit)	Corrosion rate (By Handheld meter) mpy (By weight loss methods)		Coupon's re-Installation check	Pipeline Operating Pressure	Other Readings (If Any)	Remarks
						Current reading					

Annexure-V

ORGANOGRAM FOR CMS WORK



Note-

1. Overall Project In charge/RCM should have B.E. in (Mechanical, Chemical or Metallurgical Engineering) & at least 10-year Experience in the Corrosion monitoring & prevention and shall be available for entire time schedule of the project.

2. Spread In charge/ Discipline Engineer should have B.E. or Diploma in (Mechanical, Chemical or Metallurgical Engineering) & at least 5year Experience in the Corrosion monitoring & prevention and shall be available at site office for entire time schedule of the project.

3. CVs including Experience & Qualification shall be submitted along with the bid.

Annexure-VI

FORMAT FOR SITE HANDOVER FOR INSTALLATION OF CORROSION COUPONS & CORROSION PROBES (CC & CP)

Pipeline Handover Detail									
Sr. No	Date	Location	Region	Pipeline Identification name	Pipeline Size	Pipeline Dia	Length (Km)	Other Readings (If Any)	Remarks

Bidder's Signature

MECON/IGGL Signature

Work for installation of CC & CP at mentioned locating may be started after getting approval for hot/cold work permissions/permits.

Annexure-VII

FORMAT FOR INSTALALTION, TESTING AND COMMISSIONING OF CORROSION PROBES & CORROSION COUPONS (To be submitted by successful Bidder)

Annexure-VIII

WELDING SPECIFICATION CHARTS

PIPING CLASS:		**A1A, A3A, B1A, D1A, E1A**		
MATERIAL SPECIFICATIONS	PIPES	ASTM A106 GR.B, API 5L GR B PSL2, API 5L X52 PSL2, API 5L GR X-65 PSL2, API 5L GR X-70 PSL2, IS-1239 (BLACK) **ASSORTED PIPES**		
	FITTINGS	ASTM A105, ASTM A234 GR.WPB, ASTM A234 RG.WPB-W, MSS SP-75 GR.WPHY-52, MSS SP-75 GR.WPHY-65		
	FLANGES	ASTM A105, ASTM A694 GR.F-52, ASTM A694 GR.F-65, ASTM A694 GR.F-70, ASTM A516 GR.70		
	OTHERS	-		
BASE METAL 'P' NO		**1**		
WELDING PROCESS	**GROOVE JOINTS SINGLE SIDE BEVEL**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS :**SMAW/ GTAW**	FILLER PASS : **GTAW/SMAW**	ROOT PASS : **SMAW/GTAW**	FILLER PASS : **SMAW**
	FILLET JOINTS / SOCKET JOINTS : **SMAW**			
WELDING MATERIAL	**GROOVE JOINTS**			
	BUTT		**OTHER THAN BUTT**	
	ROOT PASS : **E-6010 /ER70S-2**	FILLER & CAP PASS **ER70S-2/ ER80S-2/ E7018-1/ E8018-1**	ROOT PASS : **E-6010/ ER70S-2**	FILLER PASS : **ER70S-2/ ER80S-2/ E7018-1/ E8018-1**
	FILLET JOINTS / SOCKET JOINTS : **E7018-1**			
	BACKING RING : N.A.		**CONSUMABLE INSERT : N.A.**	
JOINT PREPARATION	API 1104 / ASME SEC. –IX			
GASES	PURGING :		SHIELDING **: Argon**	
GAS COMPOSITION	PURGING :		SHIELDING : **99.995%**	
PREHEATING / INTER PASS	PREHEAT TEMP **10 -100 Deg** **INTERPASS : Max 200 Deg**		POST HEATING : NA	
CONTINUITY OF WELDING AND PREHEAT : REFER TO SPECIFICATION				
POST WELD HEAT TREATMENT	HOLDING TEMP :		HOLDING TIME :	
	RATE OF HEATING:		MIN. HOLDING TIME :	
	METHOD OF COOLING :		RATE OF COOLING :	
MECHANICAL PROPERTY REQUIREMENTS	CHARPY 'V' NOTCH VALUE :		MIN:	AVERAGE :
	AT TEMPERATURE :		At 0°C	
	HARDNESS :			
CODE OF FABRICATION :	API 1104 / ASME SEC. –IX			
TECHNICAL NOTES :				

A. Scope of Works ICMS during warranty/ DLP period

Bidder shall provide the below given services during warranty period as a part of "warranty services" also and rate for warranty services shall be part of their base quote.

Corrosion monitoring during warranty period

- Two Nos. normal visits (once in six months) per annum for carrying out corrosion monitoring, regular preventive maintenance work, for checking the operation of system during the DLP/ Warranty period to establish the base line data of internal corrosion of the pipeline. This will include the calculating of avg corrosion rates, metal loss by ER probes and corrosion coupons including all testing/ lab testing required and Each Visit shall conclude only after the deliverables are achieved as per the approved check list/work specified by IGGL before start of the visit.

Annexure-X

Scope Matrix for Nos. Of Visit for during DLP/Warranty period - 02 visits (01 visit per six month)

Sl. No	Scope of work	Frequency of Execution	Review of reports by NACE certified Corrosion technologist	Record Maintaining
1	Preventative maintenance of the Instruments & Meters, Access fittings, Probes and Coupon holders etc.	Half Yearly	-	*
2	Painting of Yoke, JBs and maintain them in good conditions including all required consumables.	Annually	-	*
3	Retrieval of Corrosion coupons	Half Yearly	-	*
4	Retrieval of ER probes –Inspection the ER probes for its functioning, Bidder shall put back the ER probes after cleaning the same. Entire loop of each ER probe (i.e., up to corrosion meter) to be calibrated.	Half Yearly	-	*
5	Bidder shall carryout insertion of new probe, if found existing probes are consumed/life elapsed.	As required	-	*
6	Analysis of data of ER probes as per data provided by IGGL (by fetching it from CMS) on monthly basis & measure the trends and provide the effective annual corrosion rates & metal loss.	Half yearly	*	*

7	Submission of analysis report of corrosion coupons – Half yearly and the submission of analysis of ER Probe data (sent by IGGL) on monthly basis and CI dosing rates for next six month for pipeline in 15 days after completion of the field visit.	Half yearly	*	*
8	The Bidder shall ensure availability of spares & consumables for next visit & submission list of required spares and consumables for next visit.	Half Yearly	-	*
9	Review and Assessment of Corrosion data (Coupon & probes) by NACE certified corrosion specialist/Sr Corrosion technologist (SME-subject matter expert) – Which includes review & analysis of all reports & data collected during monitoring in conjunction with available ILI & ICDA data if any, suggestion on pipeline integrity issues related to internal corrosion, integration & analysis of all recorded data & historical data (historical failure and remedial taken, anomaly etc) of pipeline, recommendation for further inspection of pipeline, recommendation on material selection, locations for inhibitor installation & type of inhibitor, dosing quantity & frequency.	Half Yearly	*	*

Notes

1. *Required
2. All documents shall be in English Language.

-x-x-x-

Annexure-III
to
Particular Job Specification
(CIVIL, ARCHITECTURAL & STRUCTURAL WORKS)

INDRADHANUSH GAS GRID LIMITED

DESIGN BASIS FOR CIVIL & STRUCTURAL WORKS

DULIAJAN FEEDER LINE (DFL)
PROJECT

(Civil and Structural Section)

MECON LIMITED DELHI

Document No.	Revision No.	Date
MEC/E/0085/05/22/C&S/DB/001	Rev -1	08.06.2026

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PART -A: CIVIL WORKS

(Page 3 to 19)

PART - B: STEEL STRUCTURAL WORKS

(Page 20 to 27)

Rev. No.	Date	Prepared By	Checked By	Approved By
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PART -A: CIVIL WORKS

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1.0 INTRODUCTION

Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, GAIL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. Indradhanush Gas Grid Limited (IGGL) has been entrusted to develop North East Gas Grid (NEGG) Pipeline Network in North East region, in line with Hydrocarbon Vision 2030 for Northeast and the same is already under execution. Further, NEGG is proposed for expansion up to Duliajan for transporting Natural gas from Duliajan to NEGG along with associated facilities under DULIAJAN FEEDER LINE Project.

The segment between Dispatch Terminal, Duliajan and NEGG of 24" x 186 KM (approx.) length. The pipeline route passes mostly through agricultural terrain crosses National/ State Highways, Rivers and Railways. Estimated 9 Nos. of SV stations along with Dispatch, IP and Tap Offs are proposed along the route. Numbers and Locations of SV stations are tentative and shall be finalized during a detailed route survey based on PDI survey report, PNGRB regulations, Crossing Methodology availability of land and approach to SVs etc.

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All the associated Foundations & Civil/Structural works shall be carried out as per the relevant standard specifications listed in various General Technical Specifications.

In case of any conflict between the codes and standards listed, the same shall be brought to the notice of Owner for final decision, which shall be binding.

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2.0 SCOPE

This document establishes the minimum design criteria, material specifications, load considerations, design requirements, and methodologies to be adopted for the detailed design of Reinforced Cement Concrete (RCC) and steel structures for various facilities within the project scope.
It also defines the fundamental design basis for carrying out civil and structural engineering works associated with SV/IP/DT/RT stations. The scope of structures covered under this document includes, the following-

a- Single storey RCC framed Control room building
b- Single storey RCC framed Guard room
c- Cast in situ Boundary wall
d. Pits/trenches
e-Miscellaneous equipment foundation, Pipe supports, operating/access platforms, vent supports, cross-over, valve supports and pits etc.
f. plot development

3.0 CODES & STANDARDS

The following Indian codes and standards shall be used for design of civil works. In all cases, latest revisions with amendments, if any, shall be followed. Apart from the specific codes

mentioned herein, all other relevant and related codes concerning the specific job under consideration and/or referred to in these codes and technical specifications shall be followed wherever applicable. (All codes shall be latest as on the date of issuing of tender/bid document)

DESIGN CODES

SL. No.	STANDARD NO.		DESCRIPTION
LOADS & FORCES			
1	IS:875(Part I to V)	-	*Code of Practice for Design loads (other than earthquake) for Buildings & Structures*
2	IS:1893	-	*Criteria for Earthquake resistant design of structure*
FOUNDATION			
3	IS:1080	-	*Code of Practice for Design and Construction of Shallow Foundations in Soils (other than raft, ring and shell).*
4	IS:1904	-	*Code of Practice for Design and Construction of Foundations in Soils- General Requirements.*
5	IS:2911 (Part I to IV)	-	*Code of Practice for Design and Construction of Pile Foundation.*
6	IS:2974	-	*Code of Practice for Design & Construction of Machine Foundation*
7	IS:6403	-	*Code of Practice for determination of Bearing Capacity of Shallow Foundations.*
8.	IS:2950 Part -1	-	*Code of practice for design and construction of raft foundations*
9.	IS:8009 (Part-I)	-	*Code of Practice for Settlement of Foundations.*
CONCRETE STRUCTURES			
9	IS:456	-	*Code of Practice for Plain and Reinforced Concrete.*
10	IS: 3370	-	*Code of Practice for Concrete Structures for Storage of Liquids*
11	IS: 10262	-	*Concrete Mix Proportioning-Guidelines*
12	IS :13920	-	*Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces*
13	SP-16	-	*Design Aids for Reinforced Concrete to IS 456*
14	SP-34	-	*Handbook on Concrete Reinforcement and Detailing*
MASONRY			
15	IS: 1905	-	*Code of Practice for Structural use of Un-Reinforced Masonry.*
16	SP: 20	-	*Handbook On Masonry Design & Construction*
WATER SUPPLY & SEWARAGE			
17	SP35: 1987	-	*Hand Book on Water Supply & Drainage*
18	IS:2470 (Part I & II)	-	*Code of Practice for Soak Pit & Septic Tank*

MATERIAL CODES

SL. No.	STANDARD NO.		DESCRIPTION
CEMENT			
1	IS: 269	-	*Ordinary Portland Cement-Specification*
2	IS: 455	-	*Specification for Portland Slag Cement*
3	IS 1489(Part 1)	-	*Specification for Portland Pozzolana cement – Flyash based*
AGGREGATES			
4	IS: 383	-	*Specification for coarse and fine aggregates from natural sources for concrete*
REINFORCEMENT			
5	IS:432	-	*Specifications for Mild Steel and Medium Tensile Steel bars and Hard Drawn Steel Wires for Concrete Reinforcement (Grade-I)*
6	IS:1566	-	*Hard drawn Steel Wire Fabric for Concrete Reinforcement.*
7	IS:1786	-	*High Strength Deformed Steel bars and wires for Concrete Reinforcement.*
ADMIXTURES			
8	IS 9103	-	*Concrete Admixtures - Specification*
MASONRY WORKS			
9	IS: 1077	-	*Common burnt clay building bricks*
10	IS: 2250	-	*Code Of Practice for Preparation and Use of Masonry Mortars*
11	IS: 12894	-	*Specification for Fly ash bricks*
12	IS: 2185		*Specification for concrete masonry units- Autoclaved Cellular (Aerated) Concrete Blocks*
WATER SUPPLY & SEWARAGE			
12	IS: 651	-	*Glazed Stone ware Pipes and Fittings — Specification*
13	IS :1726	-	*Specification For Cast Iron Manhole Covers And Frames*
14	IS: 3989	-	*Centrifugally Cast (Spun) Iron and Socket Soil, Waste, Ventilating and Rain Water Pipes, Fittings & Accessories -- Specification*
15	IS:4127	-	*Code of Practice for Laying of Glazed Stone ware Pipes*
16	IS: 10500	-	*Drinking Water — Specification*
17	IS: 12701	-	*Rotational Moulded Polyethylene Water Storage Tanks — Specification*
18	IS:13592 & IS:14735	-	*Specification for Un-plasticized Polyvinyl Chloride (PVC-U) Pipes & Fittings*
19	IS: 15778	-	*Chlorinated Polyvinyl Chloride (CPVC) Pipes for Potable hot and cold-Water Distribution*

SL. No.	STANDARD NO.		DESCRIPTION
			Supplies -- Specification

4.0 **SYSTEM OF UNITS**

All analysis & design shall be carried out using the International System (SI) of units (KN, METER, etc.)

5.0 **MATERIALS**

5.1 CONCRETE

Reinforced Cement Concrete (RCC) & Plain Cement Concrete (PCC) shall conform to IS: 456 and as specified in the technical specifications.

Reinforced Cement Concrete (RCC) shall be of design grade M-25 having minimum compressive strength of 25 N/mm^2 at 28 days on standard cubes as per standard practice of code.

Plain Cement Concrete shall be of nominal mix in the proportion of 1:3:6 (M10) and 1:2:4 (M15) as specified on drawings.

5.2 CEMENT

Approved quality of Ordinary Portland Cement (OPC) of minimum Grade 43 for all the civil works conforming to IS: 269 shall be used for all civil works.

Alternatively, Portland Pozzolana Cement (PPC) and Portland Slag Cement (PSC) conforming to IS: 1489 & IS 455:1989 respectively shall be used, if Ordinary Portland Cement (OPC) is not available.

If required, special type of cement shall be provided. However, before using the special type of cement, approval shall be taken from Engineer-In-Charge.

5.3 CONCRETE AGGREGATE

All aggregates shall conform to IS: 383. Fine aggregates shall be natural sand or manufactured sand of approved quality and coarse aggregates shall be approved crushed stone aggregates.

5.4 REINFORCEMENT

Reinforcement bars for RCC shall be Thermo-Mechanically Treated (TMT) bars of Grade Fe-500D conforming to IS: 1786 and MS Round bars for Grade 1 conforming to IS: 432 Part I. 18-gauge SWG wire shall be used for binding reinforcement bars.

5.5 GROUT

Approved quality ready mix non-shrink cementitious grout shall be provided under equipment base plate, anchor holes, etc. with a crushing strength of (28 days) minimum 35 MPa.

Approved quality Grouting (including tamping) with M-30 Grade Design Mix Concrete using 12 mm downgraded coarse aggregate shall be provided for structural foundations and base plates.

5.6 ANCHOR BOLT

Anchor bolts shall be of mild steel conforming to IS: 2062/SAE 1018 with minimum yield strength of 250 MPa. Materials for washers, nuts, pipe sleeves and plates etc. shall conform to IS: 1363 & IS: 1364.

5.7 MASONARY

5.7.1 Bricks for building works shall be autoclaved aerated concrete blocks (AAC) of minimum class designation 4.0MPa conforming to IS: 2185 Part-3.

5.7.2 Bricks for other works shall be shall be common burnt clay bricks of class designation 5.0 (with minimum compressive strength of 5.0 N/mm^2) conforming to IS: 1077.

5.7.3 In case of non availability of common burnt clay bricks, fly ash bricks of minimum class designation 5.0 conforming to IS: 12894 shall be used.

5.8 POLY SULPHIDE JOINT FILLERS

All expansion Joint in buildings/ boundary wall shall be filled with approved make of Polysulphide sealant.

5.9 BITUMEN IMPREGNATED COMPRESSIBLE BOARD

Bitumen impregnated compressible board of approved make shall be used at expansion joints.

6.0 LOADS AND FORCES

6.1 GENERAL

Structures shall be designed to have sufficient structural capacity and integrity to resist safely and effectively all loads and effects of load combinations that may reasonably be expected.

The design loads used for the structures, buildings and foundations shall conform to the requirements of the governing codes and specifications. As a minimum, the design loads shall include dead load, live load, wind load and seismic load. Where applicable, the design

loads shall also include thermal load, hydro test load, impact load, vibration load and surcharge load.

6.2 DEAD LOAD (DL)

The dead load comprises of weights of all structural and architectural components and external loads pertaining to all permanent construction including walls, floor, roofs, partitions, stairways and equipment excluding their contents. Self-weight of material shall be calculated on the basis of unit weights given in IS: 875 (Part I).

6.3 LIVE LOAD (LL)

Live loads shall consist of loads due to the intended use and occupancy of the structure. Minimum live load shall be taken as 1.5 KN/sqm. This application shall be in general as per IS: 875 (Part II).
Reduction in Live load shall be per Clause 3.2 of IS: 875 (Part II).

6.4 WIND LOAD (WL)

Wind load shall be in accordance with IS: 875 (Part –III)

Basic wind speed considered for this project, V_b = 50 metres / sec

Wind Pressure for General Buildings

Design wind speed (V_z) is the one for which a structure is to be designed and is calculated from basic wind speed as:

$$V_z = k_1 \times k_2 \times k_3 \times k_4 \times V_b$$

Where,

k_1 = Probability factor (Risk coefficient) = 1.0 for General Buildings & Structures.
k_2 = Terrain Roughness & Height Factor (For terrain category 2 at height 10 m) = 1.0
k_3 = Topography factor = 1.0
k_4 = Importance Factor for the cyclonic region (industrial building) = 1.0

Design wind speed, $V_z = k_1 \times k_2 \times k_3 \times k_4 \times V_b$
$= 1.0 \times 1.0 \times 1.0 \times 1.0 \times 50$
= 50 metres /sec

The design wind pressure (P_z) at any height shall be obtained by the following equation:

Design wind pressure, $P_z = 0.6 \times V_z \times V_z$
$= 0.6 \times 50 \times 50$

P_z = 1500 N/m^2 = 1.5 KN /m^2 for general buildings as structures at height 10 m above FGL.

Wind Pressure for Boundary Wall

Design wind speed (V_z) is the one for which a structure is to be designed and is calculated from basic wind speed as:

$$V_z = k_1 \times k_2 \times k_3 \times k_4 \times V_b$$

Where,

k_1 = Probability factor (Risk coefficient) = 0.71 for Boundary Wall.
k_2 = Terrain Roughness & Height Factor (For terrain category 2 at height 10 m) = 1.0
k_3 = Topography factor = 1.0
k_4 = Importance Factor for the cyclonic region = 1.0

Design wind speed, Vz $= k_1 x\ k_2 \times k_3 \times k_4 \times V_b$
$= 0.70 \times 1.0 \times 1.0 \times 1.0 \times 50$
$= 35$ metres /sec

The design wind pressure (P_z) at any height shall be obtained by the following equation:

Design wind pressure, Pz $= 0.6 \times V_z \times V_z$
$= 0.6 \times 35 \times 35$

$P_z = 735.0\ N/m^2 = 0.735\ KN/m^2$ for Boundary Wall

6.5 SEISMIC LOAD (SL)

Seismic forces shall be as per IS: 1893-2016.The detailing of reinforcement shall be as per IS: 13920.

Factors for the calculation of the seismic loading, i.e. soil profile etc. shall be as per Geotechnical Investigation and in accordance with the requirements of the IS standard.

Basic Seismic Loading parameters:

- Seismic Zone : Zone V
- Zone factor, Z : 0.36
- Importance Factor I : 1.5

6.6 IMPACT LOAD (IL)

Impact loads shall be shall be defined as an equivalent static force caused by a moving object and calculated in accordance with the requirements of code. For loads being given by equipment supplier, impact loads shall be as per information given on civil assignment drawing of equipment supplier. Impact loads shall not be used with wind/seismic load cases.

6.7 Hydrostatic, Earth Pressure and Surcharge Loads

In the design of structures or parts of structures below ground level, such as retaining walls and other walls in basement floors, the pressure exerted by soil or water or both shall be accounted for. Due allowance shall be made for possible surcharge from stationary or moving loads. When a portion or whole of the soil is below the free water surface, the lateral earth pressure shall be evaluated for weight of soil diminished by buoyancy and the full hydrostatic pressure.
Checking for overturning of foundation under submerged condition shall be done considering buoyant weight of foundation, as per requirement of IS: 875 (Part-5);

For a filling with level surface, the horizontal active earth pressure is given by:
Q = DH (1 – sin Z / 1 + sin Z)
Where,
Q is the lateral earth pressure
D is unit weight of retained soil
H is the depth below surface
Z is the angle of internal friction of retained soil;
Surcharge load is to be considered as equivalent increase in earth height;

Passive earth pressure shall not be taken for relief in pressure calculations; In the design of foundations, the upward pressure of water, if any, shall be taken as the full hydrostatic pressure applied over the entire area. The hydrostatic head shall be measured from the underside of the construction. Factor of safety against uplift shall be 1.2. For purpose of calculating downward load due to over burden, the weight for the same shall be calculated for volume over projected plan area only. In other words, volume of overburden beyond projected plan area shall not be considered. Overburden load shall be considered as dead load of soil under dry condition.

6.8 PIPING LOAD (PL)

Piping loads (PL) shall be considered as follows:

- Piping load for Empty condition P (E)
- Piping load for Operating condition P (O)
- Piping load for Test condition P (T)
- Weight of Valves (if any)
- Wind loads on pipe

In calculating the actual weight of pipe, the class of pipe, material contents and insulation, if any, shall be taken into consideration.

6.9 THERMAL LOADS(TL)
Thermal force is defined as the force occurring due to thermal expansion/contraction of the structural materials, the force occurring at piping and equipment anchor points and the sliding

friction forces to thermal expansion or contraction. The sliding friction force shall be calculated in accordance with the actual conditions. The friction co-efficient to be used in determining lateral loads due to sliding shall be as follows:

A	TEFLON PADS	0.1
B	STEEL PLATES	0.3
C	STEEL TOCONCRETE	0.5
D	CONCRETE TO SOIL	0.45

6.10 OTHER LOADS

Design of all structures shall also consider any other relevant stress imparted to the structure due to variation in daily and seasonal temperature, water table, erection and maintenance loads, creep, shrinkage etc.
The load factors and load combinations to be used in design of structures shall be as per IS: 456.

6.11 LOAD COMBINATIONS

Structures, buildings and foundations shall be designed to sustain the maximum stresses which may be induced by an individual load case and / or a combination of these loads which may act together. In general, all buildings shall be designed for worst effect.

Load combinations using limit state design shall be as IS 875 Part V.

7.0 ANALYSIS AND DESIGN METHODOLOGY

7.1 GENERAL

Limit state method as per IS: 456 shall be followed in the design for concrete structures except for liquid retaining structures. The design of liquid retaining structures shall be carried out using working stress method as per IS: 3370. Detailing of reinforcement shall be done according to IS: 13920 and SP: 34.

All the buildings shall be analyzed & designed as 3-D space frame model using software STAAD Pro.

Appropriate amount of live load shall be considered and while calculating earthquake forces. Permissible stresses increase in materials shall be as per respective IS code and shall be considered under Wind/Seismic loading. Appropriate load factor for Limit State Design shall be considered as per code provisions.

Life of structures shall be taken as 50 years for wind/seismic load calculations

7.2 FOUNDATIONS

Foundations shall be designed as "*Shallow Foundations*" or ''*Deep Foundations*'' as per geotechnical report. If soil conditions are not favorable for shallow foundation, the pile foundation work shall be carried out as per geotechnical report.

For Shallow Foundations, the minimum depth of foundation shall be 1.0 m for footing from natural ground level. The minimum width for footing shall be 1000 mm. The minimum thickness of footing shall be 300mm.

In case of high-water table/ Liquefaction potential are encountered, foundation design shall incorporate necessary remedial measures as per the geotechnical investigation data and recommendations.

Foundations shall be designed for 40 mm settlement.

FACTOR OF SAFETY FOR FOUNDATION DESIGN

TYPE OF STRUCTURES	Minimum factor of safety against Overturning		Minimum factor of safety against Sliding	
	With Wind or Seismic	Without Wind or Seismic	With Wind or Seismic	Without Wind or Seismic
All Building/Structures/ supports	1.5	2	1.5	1.5
Retaining wall	1.5	2	1.5	1.75

7.3 COVER REQUIREMENTS

All main reinforcement shall have clear concrete cover requirements as per following:

Footings : 50 mm
Pile Cap : Bottom Face – 75 mm and Top & Sides Face – 50 mm
Columns : 40 mm
Beam : 30 mm
Slabs : 20 mm

7.4 MINIMUM THICKNESS OF STRUCTURAL CONCRETE ELEMENT

The following minimum thickness shall be followed:

Footings (all types, with or without beams) : 300 mm
Pile Cap : 500 mm
Floor/ Roof Slab : 125 mm
Cable/ Pipe Trench Walls & Base Slab : 100 mm

Precast Trench Cover : 100 mm

7.5 ALLOWABLE DEFLECTIONS

The deflections of the buildings based on the worst load combination shall be limited to an acceptable level as defined below. Deflections in concrete structures shall be limited by adherence to the limits on span/depth ratio for beams, slabs & length/lateral dimensions for columns as specified in IS: 456. Calculated vertical deflections for concrete members shall not exceed the following as per Clause 23.2.1 of IS 456:

For cantilever beams : 7
For simply supported beams : 20
For continuous beams : 26

Total vertical deflection due to all loads including the effects of temperature, creep & shrinkage = Span/250

7.6 MACHINE FOUNDATIONS

Machine foundations shall satisfy the requirements of IS: 2974 and any other parameter as specified by the machine manufacturer.

7.7 PILES AND PILE CAPS

Bored Cast In-situ End-Bearing / Friction Piles shall be spaced at 3.0*d (d = diameter of piles) apart in regular grids in rectangular, square, trapezoidal or triangular pile cap system for pile cap.

In case of Bored Cast In-situ Under-reamed Piles, the minimum spacing shall be 1.5 times the bulb diameter.

Pile cap shall be designed in flexure and shear. Minimum embedment of piles in pile caps shall be 75 mm.

Diameter, length, type and the capacity of piles shall be as per soil investigation report. Pile capacities shall be confirmed with pile load test.

8.0 PLOT DEVELOPMENT & BOUNDARY WALL

8.1 The site preparation shall conform to the requirements of the relevant sections of this design basis and technical specifications. All the tree roots and vegetation shall be grubbed up minimum 150 mm depth and removed from site.

8.2 On finalization of the plot of Terminals and SV, *Topographical Survey and Geo-technical Investigations* shall be carried out by the executing agency as per technical specifications.

8.3 The grading of the area shall be done by cutting and filling with the following:
Cutting area: Thoroughly rolled and compacted.
Filling area: Compacted in layers not exceeding 30 cm in loose thickness to achieve minimum 95 % of maximum dry density.

8.4 Highest Flood Level: From topography survey data

8.5 Plant Finished Ground Level (FGL): Highest Flood Level of the area or 300 mm above Existing Road Top Level whichever is higher.

8.6 Finished Floor Level of the Buildings shall be covered under Architectural Design Basis.

8.7 Boundary Wall:

2.4-meter high RCC Boundary Wall (Brick filler type with RCC columns, beam, coping and foundation) with an additional 0.6m high barbed wire & concertina coil (600 mm diameter) overhead on 'Y' shape structural steel frame shall be provided for all stations/terminals. Plastering, Painting and Logo shall be covered under Architectural Design Basis.

75 mm diameter weep holes shall be provided in Substructure brickwork / retaining wall at 750 mm C/C spacing in a staggered (alternate) pattern, including providing PVC pipe sleeves, surrounding with graded filter media (coarse sand / gravel).

9.0 PROCESS AREA

9.1 Process area is the area which houses the valves, equipment's, metering skid etc. Entire process area shall be paved with 150 mm thick M-25 concrete pavement with nominal reinforcement of 8 diameter @ 200 c/c (both ways at bottom) laid over 100 mm PCC (1:3:6). PCC shall be laid over 200 mm sand filled over well compacted sub base. The paving shall be laid in panels and designed joints shall be provided with approved quality separators & joint sealant.

9.2 EQUIPMENT FOUNDATION

Equipment foundation supporting lightweight equipment and coming within the process area may be made an integral part of the paved area. However, heavy equipments shall have isolated equipment foundation even if coming within process area.

Loose fills if found beneath the equipment foundation shall be removed and back filled either with PCC 1:3:6 (M10) or as directed by Engineer In charge. Suitable measures as per recommendations in Geotechnical Report shall be considered in design.

9.3 PIPE SUPPORT FOUNDATIONS

Pipe supports shall be provided as per technological layout drawings for piping. The pipe support may lie within the process area or at any other location. The pipe support foundations shall be designed to take care of the loads and it's fixing details as per standard drawings.

Pipe support in process area shall be integral part of pavement. Isolated pipe supports shall however be provided outside the process area.

10.0 **BUILDING WORKS**

10.1 Control room, Guard Room and Store room Building shall be designed and detailed in accordance with relevant architectural drawings, topographical survey, geotechnical report and technological drawings.

10.2 The building shall be RCC framed structure with infilled AAC Blocks masonry.

10.3 Anti-termite treatment as per IS: 6313 shall be provided to the building foundations, plinth and under flooring inside the building.

10.4 40 mm thick Damp Proof Course (DPC) with cement concrete 1:2:4 (M15 grade) along with water proofing compound shall be provided wherever required. using aggregate of 10 mm and downgraded and mixing approved water proof admixture with cement as per manufacturer's specification including necessary formwork/shuttering, one coat of hot bitumen of grade VG-10 over the top surface of Damp proof to be provided.

10.5 All underground concrete and masonry structure except fly ash bricks in contact with earth shall be provided with two coats of hot bitumen application. Fly ash bricks in contact with earth shall be plastered.

10.6 All structural concrete for RCC elements shall have a minimum compressive strength of 25 N/mm^2 (**Grade M-25**) at 28 days.

10.7 Brick Masonry (if required) shall be laid in cement mortar 1:4 (in coarse sand) and strength not less than 5 MPa.

10.8 RCC channels for cables trenches shall have provision of MS Chequered plate/ F.R.P. grating /PVC coated on MS plate covers in control rooms/ electrical room (as per requirement) as per relevant technical specifications.

10.9 Inserts shall be provided as per technological requirements.

10.10 Grade slab in flooring shall be of 150mm thick RCC of M-25 grade laid over 100mm thick PCC 1:3:6 (M10). The PCC shall be laid over a compacted sand layer of 200mm on well prepared sub base for control room and store room building. For Guard Room, Grade slab in flooring shall be of 150mm thick PCC 1:2:4 (M15) shall be laid over a compacted sand layer of 200mm on well prepared sub base.

10.11 Building shall be provided with minimum 750 mm wide plinth protection around the building or as per construction drawing. The plinth protection shall be 100 mm above respective Finished Ground Level.

11.0 ROADS AND CULVERTS

11.1 ROADS

Roads shall be of RCC road. Carriageway shall be of minimum 3-meter width with 0.5 m wide shoulders on both sides or as per construction drawing. The minimum radius of curvature of the turnings shall be 6.0 m unless otherwise mentioned in the relevant drawings.

Roads for access to process area as well as around equipment foundations must be paved with 150 mm thick M-25 concrete with nominal reinforcement of 8 diameter @ 200 c/c (Both ways at top & bottom) laid over 100 mm P.C.C. (1:3:6). The PCC shall be laid over compacted water bound macadam base course over well compacted sub base.

Roads shall be cast in panels of size 3mx3m for contraction joints and 21m in length for expansion joints. Approach roads including culverts within the station and also inside the process area shall be provided as per requirement.

Approach road shall be of RCC and shall also be connected with nearest existing metallic road/approach road outside the station for all stations.

11.2 CULVERTS:

Box shaped RCC culverts shall be provided for crossing drains under the roads. If required RCC Hume pipe NP-3 class may also be considered for crossing drains under the roads as per site conditions. A clear cushion of 600 mm must be provided for RCC Hume pipe. If the cushion is less than 600 mm, it shall be encased with PCC as per design.

12.0 STORM WATER DRAINAGE

12.1 Storm water drains shall be sized for the discharge arising out of rain water.

12.2 Design rainfall intensity of 50 mm /hr shall be considered for design of storm water drainage system.

12.3 Rain water run-off shall be computed by the formula: -

$Q = (KIA)/360$ where,

K = Surface run off coefficient
A = Catchments Area in hectares contributing towards the drain
I = Design Rainfall intensity in mm per hour
Q = Discharge

12.4 Runoff Coefficient shall be considered as follows

a) Building Roof = 1.0
b) Concrete Paved area = 1.0

c) Bituminous Paved area = 0.9
d) Compacted but Unpaved areas = 0.7
e) Unusable/Green Belt area = 0.4

12.5 Design of drains shall be based on Manning's formula: -

$V= [(R^{2/3}) * (S^{1/2})] / n$ where,

V= Flow velocity in m/s
R= Hydraulic radius
S= Slope
n= Roughness Coefficient

Roughness Coefficient **'n'** shall be considered as follows;
a) Plastered surfaces = 0.013
b) Cast in situ concrete = 0.015

12.6 The following points are to be followed while sizing the storm water drains

Minimum velocity in drains = 0.6 m/s
Maximum (Scouring) velocity in drains = 2.4 m/s
Preferred (Self cleansing) velocity in drains = 1.0 m/s
Minimum depth of drains = 300 mm
Minimum width of rectangular drains = 300 mm (for depths less than 500 mm)
Minimum width of rectangular drains = 500 mm (for depths more than 500 mm)

12.7 Suitable rainwater harvesting measures for the entire plot area including roof area to facilitate recharging of bore well shall be designed and executed.

12.8 Roof drains will connect water to storm water drains. Any drainage outside the building will be carried away from the building to the nearest storm water drains.

12.9 Drain section shall be rectangular type brick masonry drains along the periphery of plot to carry storm water from plot area to nearby drain. The drain shall have slope of 1 in 300 (minimum).

13.0 WATER SUPPLY AND SEWERAGE SYSTEM

13.1 WATER SUPPLY

The water distribution system to wash basins, sinks, water coolers, showers and other fixtures along with flushing water supply to water closets, urinals for all blocks shall be through gravity. Water shall be supplied either by suitable tap-off from government water supply or by bore well at each location along with suitable pumping and plumbing arrangement. All external & internal water supply piping will be of Chlorinated Polyvinyl Chloride (CPVC) pipes as per IS: 15778 (Class 1 SDR 11).

Internal water supply will be concealed in wall/floor & external water supply will be exposed to

wall with clamping and buried in earth as per requirement.
15 mm, 20 mm & 25 mm diameter of pipe shall be used in internal water supply and 25 mm & 32 mm diameter pipe shall be used for external water supply to overhead water reservoir tank.

13.2 SEWERAGE SYSTEM

13.2.1 INTERNAL & EXTERNAL

The drainage system considered in the design is a two-pipe system as per National Building Code Part – 9 – Plumbing Services – 2005. Soil & Waste pipes shall be distinct and separate.

Soil and waste shall be carried down in separate independently vented pipes. The sanitary, waste & vent system shall be water tight and gas tight designed to prevent escape of foul gas and odour from various fixtures.

Unplasticized Polyvinyl Chloride (PVC-U) Pipes conforming to IS: 13592 & Unplasticized Polyvinyl Chloride (PVC-U) Fittings conforming to IS: 14735 shall be used for Soil & Waste Discharge System for Inside & Outside Buildings including Ventilation.

Provision of Anti-siphonage pipe shall be made for hygiene, safety considerations and to avoid entry of foul smell into occupied area from soil pipes.

Soil pipe will be directly connected to inspection chamber located at ground level & waste pipe shall be connected to inspection chamber through Gully trap.

13.2.2 SOAK PIT & SEPTIC TANK

Soak Pit & Septic Tank shall be made as per IS: 2470. Size of septic tank and soak well shall be decided considering the number of users.

Percolation Test for Soak Pit shall be done as Per IS: 2470 (Part -2). Percolation test shall be conducted to determine the permeability of the soil to dispose of the effluent.

PART -B: STEEL STRUCTURAL WORKS

PART -B: STEEL STRUCTURAL WORKS

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1.0 SCOPE OF WORK

1.1 This design basis covers general requirements and conditions needed for the design of Steel Structural works for different facilities to be built. However, all the structures shall be designed for satisfactory performance and intended usage.

The scope of work to be performed shall include complete steel structural works as per plans, equipment layout, drawings & technical specifications for Dispatch Terminal, SV Stations, I.P. Stations, Receiving Terminals and others.

Platforms and Crossovers shall be provided at all stations as per requirement for operations and maintenance.

Chain Link Fencing shall be provided as per requirement.

Pipe supports, Steel Entrance Gates for Boundary Wall, Monorail beams in store room buildings or others as per requirement.

This document shall be read in conjunction with technical specifications and particular scope of works. All the structures shall be designed for satisfactory performance and intended usage.

All Structural works shall be carried out as per the relevant standard specifications listed in various General Technical Specifications.

2.0 CODES & STANDARDS

2.1 The following Indian codes and standards shall be used for design of Steel Structural works. In all cases, latest revisions with amendments, if any, shall be followed. Apart from the specific codes mentioned herein, all other relevant and related codes concerning the specific job under consideration and/or referred to in these codes and technical specifications shall be followed wherever applicable. (All codes shall be latest as on the date of issuing of tender/bid document).

	LOADS & FORCES		
1	IS:875(part I to V)	-	Code of Practice for Design loads (other than earthquake) for Buildings & Structures.

Sr. No.	BIS Standard no.		Description
2	IS:1893	-	Criteria for Earthquake resistant design of structure.
3	IS:800	-	Code of Practice for General Construction in Steel.
4	IS:808	-	Dimensions for Hot rolled steel beams, Channel and angle sections
5	IS:806	-	Code of Practice for use of Steel Tubes in general Building Construction.
6	IS:2062	-	Steel for general Structural Purposes.
7	IS:3502	-	Steel Chequered Plates.
8	IS:1363	-	Hexagonal head bolts, Screws and Nuts of Product Grade C,
9	IS:1367	-	Technical Supply conditions for Threaded Steel Fasteners.
10	IS:2062/ SAE 1018	-	Specification for Foundation Bolts.
11	IS:2016	-	Plain Washers.
12	IS:277-2018	-	Galvanized Steel Sheet (Plain and Corrugated)
13	IS:1728	-	Specification for Sheet Metal Rain Water Pipes, normal size gutters, fittings and accessories.
14	IS:278-1978	-	Specification for Galvanized Steel Barbed wire for fencing.
15	IS:2721-2003	-	Galvanized Steel Chain Link fence (Fabrication Specification)
16	IS:2932-2003	-	Synthetic Enamel Paint
17	IS: 814	-	Specification for covered electrodes for manul metal arc welding of carbon and carbon manganese steel

3.0 SYSTEM OF UNITS

3.1 All analysis & design shall be carried out using the International System (SI) of units (KN, METER, etc.)

4.0 LOADS AND FORCES

4.1 GENERAL

4.1.1 Design loads shall comply with the requirements of IS: 875 and IS: 1893 as minimum, unless more stringent requirements are specified herein. All Steel structures works shall be in general designed for the worst possible combination of the following loads.

1. Dead load (DL)
2. Live load (LL)
3. Wind load (WL)
4. Seismic load (SL)
5. Piping load (P)

4.2 DEAD LOAD (DL)

4.2.1 Dead load shall include self-weight of all structural components viz columns, rafter, purlins, girts, floor beams, grating, hand-railing roof & side sheeting, platforms, monorail and dead load of any equipment supported on structural platform/floor. All dead loads shall be considered in accordance with IS:875 Part-I .

4.3 LIVE LOAD (LL)

4.3.1 In general, live loads shall be considered as per IS: 875 Part II. However higher loads may be considered in case of technological requirements.

All walkway plat form shall be designed considering load of 500 Kg/Sq.m.

4.4 WIND LOAD (WL)

4.4.1 Wind loads shall be considered as per IS: 875 Part III -2015. The basic wind speed and factor are given below:

- **Basic Wind Speed - 50 m/sec**
- **K1 (Risk Coefficient) - 1.0**
- **K2 (Terrain Factor) -** As per IS:875(3) for Terrain Category 2
- **K3 (Topography Factor) - 1.0**
- **K4 (Cyclone Factor) - 1.0**
- **Other relevant factors -** As per relevant clauses of IS:875(3)
- **Pressure coefficients -** Determined in each case as per IS:875(3) (Wind ward side and Leeward side)

4.5 SEISMIC LOAD (SL)

4.5.1 Seismic loads shall be considered as per IS: 1893 -2016.

4.6 PIPING LOAD (P)

Piping loads shall be considered as follows:

i. Piping load for empty condition P (E)
ii. Piping load for operating condition P (O)

iii. Piping load for test condition P (T)
iv. Weight of valves (if any).
v. Wind loads on pipe.

5.0 ANALYSIS AND DESIGN METHODOLOGY

5.1 All the buildings shall be analyzed as 3-D space frame model using software STAAD.Pro.

5.2 Steel structures shall be designed as per IS: 800-2007.

5.3 Appropriate amount of live load shall be considered and while calculating earthquake forces.
On roofs, live load shall be considered as per codal provisions while calculating earthquake loads.

6.0 LOAD COMBINATION.

6.1 Various design loads considered shall be combined in accordance with IS: 875 (part-V)-1987 and IS:800-2007, to give the most severe loading condition for design of structures.

7.0 BASIC ENGINEERING DESIGN DATA

7.1 Design shall be based on the Assignment received from technological section.

7.2 Life of structures shall be taken as 50 years for wind load calculations.

8.0 MATERIALS

8.1 STRUCTURAL STEEL

- Structural steel to be used for general structural purpose shall be of Grade Fe 410 MPa conforming to IS: 2062-2011. The min. tensile strength shall be 410 MPa. The min. yield strength shall be as follows:

a. Thickness <20mm 250 MPa
b. Thickness between 20-40 mm 240 MPa
c. Thickness >40 mm 230 MPa

- Steel Tubes for structural purpose shall conform to IS: 1161-2014 of Grade YSt310 MPa
- Chequered plate shall conform to IS:3502-2009.
- Materials for hollow sections shall conform to IS:4923-1997

8.2 BOLTS, WASHER AND NUTS

Bolts, washer and nuts materials shall conform to IS:1363-2002.

8.3 ANCHOR RODS AND THREADED RODS

Anchor bolts shall conform to IS 2062 or SAE 1018 with minimum yield strength of 250 MPa. Nuts and lock nuts shall conform to IS 1363 (part 1 to 3) and washer shall conform to IS: 2016. All anchor bolts shall have lock nuts.

8.4 FILLER METAL AND FLUX FOR WELDING.

Filler metal and Flux for welding material conforming to IS: 814-2004

8.5 METAL ROOF AND SIDE SHEETING.

Zincalume high tensile steel sheet shall be of 0.5mm thick (TCT) and shall have trapezoidal profile shall be made out of steel of minimum fy= 550MPa conforming to IS:15961.

8.6 CHAIN LINK FENCING

Material for chain link fencing shall conform to IS: 2721-2003.

8.7 BARBED WIRE

Material for barbed wire shall conform to IS: 278-2006.

8.8 MS GRATING

25 mm thick MS grating for platform, cross over, stair case etc. As per specification and Drawings. Material shall be conformed to IS: 2062-2011.

9.0 FABRICATION, ERECTION AND QUALITY CONTROL.

- Fabrication, Inspection & Erection of steel structures shall be done in Accordance with IS: 800-2007 and in conformity to the Technical Specification.
- Fabricated structures shall conform to tolerance as specified in IS: 7215-1974.
- Maximum permissible Tolerance in erected steel structures shall be Conform IS: 12843-1989

10. PAINTING SYSTEM

Painting system conforming to IS: 2932-2003.

The recommended painting system for general service requirement of steel structures covering surface preparation, application of primer coats, intermediate coats and final coats to develop the required minimum dry film thickness on steel surface is indicated as below

a. Surface preparation Sa 2½ according to IS:9954.
b. Primer paint: Two coats of epoxy based red oxide or zinc phosphate (DFT 40µ/coat)
c. Intermediate paint: One coat of epoxy-based MIO (DFT 75µ)
d. Finishing paint: Two coats of epoxy amine/polyamide cured finish (DFT 40µ/coat)

Total DFT 235 µ min. of approved color

11. MISCELLANEOUS DESIGN REQUIREMENT:

- Column bases shall be pinned/Fixed (as per requirement).
- Minimum thickness of all Built up section shall be 6 mm for web & Flange.
- Structural connections shall have minimum two bolts of 16 mm diameter,
- Minimum size of anchor bolt shall be 16 mm
- Minimum size of fillet weld shall not be less than 6 mm unless otherwise noted
- The Built-up section shall be welded by continuous automatic submerged arc welding process on both sides with minimum welding of 5mm thk.
- Welded connections shall be adopted during shop fabrication, except where only Bolted connections are required. Field/ site connections shall be bolted/ welded

PARTICULAR JOB SPECIFICATION
CIVIL WORKS

CIVIL ENGINEERING WORKS

I) GENERAL

Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, GAIL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. Indradhanush Gas Grid Limited (IGGL) has been entrusted to develop North East Gas Grid (NEGG) Pipeline Network in North East region, in line with Hydrocarbon Vision 2030 for Northeast and the same is already under execution. Further, NEGG is proposed for expansion up to Duliajan for transporting Natural gas from Duliajan to NEGG along with associated facilities under DULIAJAN FEEDER LINE Project.

The segment between Dispatch Terminal, Duliajan and NEGG of 24" x 180 KM (approx.) length. The pipeline route passes mostly through agricultural terrain crosses National/ State Highways, Rivers and Railways. Estimated 9 Nos. of SV stations along with Dispatch, IP and Tap Offs are proposed along the route. Numbers and Locations of SV stations are tentative and shall be finalized during a detailed route survey based on PDI survey report, PNGRB regulations, Crossing Methodology availability of land and approach to SVs etc.

M/s MECON Ltd has been engaged by M/s IGGL to carry out design, engineering, procurement, inspection & Project Management Consultancy Services required transportation and distribution of Natural Gas.

The scope of work to be performed under this contract shall include complete civil works as per plans, equipment layout, drawings & technical specifications.

The contractor shall maintain proper record of all the materials/ equipment procured w.r.t. their source & specifications with details of their manufacturing and recycled content etc. and submits along with all supporting documents/photographs to Client & PMC for record purpose.

Civil Works in the present tender involves construction of Terminal / Stations of the pipeline are as under:

Sl. No.	Type of Station	Estimated Chainage (Km)
Duliajan-Jorhat Pipeline (Duliajan Feeder Line) – 180 Km		
1	Dispatch Terminal, Duliajan	Ch. 0.00
2	SV-01	Ch. 16.00
3	SV-02	Ch. 32.00

Sl. No.	Type of Station	Estimated Chainage (Km)
4	SV-03 CUM INJECTION POINT FOR LEPETKATA	Ch. 48.00
5	SV-04	Ch. 64.00
6	SV-05	Ch. 80.00
7	FUTURE TAP-OFF POINT FOR LAKWA	Ch 85.00
8	IP STATION-I	Ch. 96.00
9	SV-06	Ch. 112.00
10	SV-07	Ch. 128.00
11	SV-08	Ch. 144.00
12	SV-09	Ch.160.00
13	Receiving Terminal at Jorhat	Ch. 174.24

II) SCOPE OF SUPPLY

Contractor shall procure & supply to site all the materials including cement, reinforcing steel, steel sections/plates other masonry materials, admixtures & bonding agents, sealants, sand, etc. and any other construction material / item required to complete the civil works.

All costs towards testing/inspection of materials/goods shall be borne by the Contractor. No materials/items shall be supplied by the Owner.

III) SITE WORK

Complete construction work including supply of labour, construction materials, construction equipment, survey, tools & tackles, dismantling & modification/ strengthening, supervision, testing etc. required to complete all the structures, foundations, finishes, steel inserts, painting, including site grading/ earthwork in cutting & filling etc. as specified/ applicable and required to complete the civil works in all respect.

(All enabling works, e.g., construction water tank, fabrication yard, electricity, site stores & office, safety and security measures, coordination with other contractors working at site etc. shall be Contractor's responsibility.

Special permits to such as 'Hot Permit", "Fire Safety Permit" to work at project site, if required, shall be contractor's responsibility.)

IV) SCOPE OF WORK

The scope of work shall be broadly, but not limited to, the following:

a) Location and chainage of Terminal/Station is tentative.

b) In Some plots, soil filling with approved good quality earth shall be carried out up to an approximate height of 1.5 m over an area of approx. 60m X 60m for SV stations and 100 m × 100 m for DT/RT/IP stations or as per requirement. Soil filling shall be done in layers of 300mm with proper compaction to achieve the 95 % modified proctor density.

c) Site grading of plots by removing 150mm top soil (as required) including plot development by filling with good quality earth as per specification upto proposed finished ground level.

d) Earth filling in embankments for external roads wherever required with provision of RCC Culverts/ Pipe Culvert.

e) Construction of approach road with embankments.

f) Construction of RCC retaining wall all around the plot boundary for retaining filled up earth.

g) Construction of new RCC framed Boundary Wall at an interval of 3.0 m or as specified and height 3m with infill brickwork, PCC Coping, MS Y Angle Posts and Concertina coil with RBT fencing etc as per drawing.

h) RCC cable trenches: complete civil works for cable trench including providing inserts, conduits (GI, PVC or HDPE etc.) and MS Chequred cover plate/ Pre cast concrete covers as per requirement.

i) Supply and stacking of aggregate of non-paved/constructed areas as specified.

j) Storm water drainage system in brick drains along with plastering with complete civil works as per requirement.

k) Construction of Control building, Store room and Guard room as per relevant architectural drawings.

l) The buildings shall be RCC framed structure with infilled AAC Blocks masonry.

m) Construction of Bore well, hand pump as per specifications.

n) Paver Block Walkway / Flooring / Pavement with 60 mm thick interlocking paver blocks of M30 Grade.

o) Laying PCC kerb stones 125mm x 300 mm over 75 thk PCC base as specified.

p) Supplying, stacking and spreading of stone aggregate at desired locations inside the plot over well compacted earth.

q) Construction of process area and pipe supports as per drawings

r) Boring and installing cast in situ skin friction/end bearing pile of upto 500 diameter 30T capacity if required as per recommendations in geo- technical reports.

s) Construction of cofferdam and dewatering of the plot.

t) Construction of rain water harvesting pit, soak pit & Septic tank.

u) Plumbing and sanitary piping works (Preparation of the sketch/GA for sanitary system & Plumbing system shall be in CONTRACTOR's scope for work)

v) Dismantling of existing boundary wall and modification in existing drain at DT Duliajan.

w) Existing drain shall be utilized to the maximum extent at DT Duliajan.

x) Supply, Fabrication and Erection of Mild Steel Gate in boundary wall.

y) Water body bank and bed stabilization as per requirement.

z) Provision of all inserts, conduits, pre-cast covers, fixing of free issue Items into permanent works etc.

aa) Dry Stone pitching shall be provided on slope embankment.

bb)

cc) Clearing all construction debris and handing over completed work site.

dd) Any other work not specifically mentioned but required to make the terminal functional.

ee) Marking as-built details/drawings on one set of construction drawings and return to owner.

gg) **Photographs** during various stages of construction for documentary evidence.

Civil works shall be carried out for the scope of work listed as above. Bidder shall understand the scope of work by visiting the work site in advance at his own expenses if required and required to complete all the civil works as per specifications, SOR, drawings

and as directed by Engineer-in-charge.

Work to be executed shall include but not limited to the following:

1.0 All enabling works e.g. provision of site office for Contractor's personnel, temporary roads & drains, storage facilities for cement, steel & other materials, provision of lights, survey work, workshop etc. which are required for efficient working and timely completion of works.

1.1 Testing laboratory at site which is required for carrying out routine tests of Workmanship as part of Quality Assurance.

1.2 Site leveling & micro-leveling after dismantling of all temporary works.

1.3 Submission of all original test certificates & records of testing, all warranties, performance guarantees in favour of IGGL.

1.4 Any other works which may be necessary for completion of Construction and associated works.

PREAMBLE TO SCHEDULE OF ITEMS

1.0 **GENERAL**

This preamble to the schedule of items is an integral part of the schedule and shall have as much force as though this is incorporated into the description of the items themselves.

Contractor's rate for any items of work in the schedule of items shall, unless otherwise stated, be held to include the cost of all materials, including wastages, conveyance and delivery, unloading, storing, fabrication, hoisting, all labour for finishing to required shape and size, tools and plants, power, fuel, consumables, all taxes royalties, other revenue expenses, temporary facilities like roads, drains etc., providing temporary storage facilities for cement, steel and other materials and their subsequent dismantling, scaffolding and other temporary works, setting out, fitting and fixing in position, site drainage, dewatering, offering samples for approval, cost of all tests, rectification of all defects, replacement of defective materials and work, interruptions to work required to accommodate the work of other agencies working on the site, continuation of work beyond working hour, in the night and holidays also if situation warrants so, site clearance on completion, maintenance work during the period of maintenance, bye-work necessary to complete any particular item of work as per specification and direction of the E-I/C, overheads, profit and other incidental charges.

2.0 EARTH WORK

The rate of the related items shall include, but not limited to the following:

2.1 GENERAL

2.1.1 Setting out works, profiles etc. with reference pillars and their removal after completion of work.

2.1.2 Taking levels and reference axes wherever necessary from reference lines and bench mark, both for the original ground level as well as for the finished Work as directed.

2.1.3 Unless otherwise specified site clearance such as clearing of shrubs, green brush wood, under-growth and small trees not exceeding 30 cm. in girth at one meter above ground including uprooting stacking the serviceable materials within any lead and removal of all the rubbish unserviceable materials up to 1 Km lead.

2.1.4 Working in dry, wet and foul condition.

2.1.5 No distinction of rate between the work done manually or mechanically.

2.1.6 Dewatering, wherever necessary.

2.1.7 Costs of all tests necessary and/or directed for the compaction of the filling/back filling of site leveling works.

3.0 EXCAVATION AND BACK FILLING

3.1.1 Planking and strutting to retain the excavated sides and to protect the adjoining structures and services including removing the same.

3.1.2 Dewatering of accumulated water from any source till completion of all work below ground level including provision of surface drains, catchment pits, etc., wherever necessary.

3.1.3 Providing adequate protection for safety of labour, materials, adjoining property, services, structures and equipment and install barriers around the excavation area, foundation, trenches, pits and red lights during night time, engage night watchman for safety against risk or accident.

3.1.4 Stacking the excavated materials within the specified leads.

3.1.5 Forming (or leaving) suitable steps on the sides or/and providing adequate and stable side slopes in case of deep foundation or soft, loose or slushy soil and removal of steps after measurements.

3.1.6 Removing slips or falls in excavations.

3.1.7 Dressing and trimming to required level, profile and gradient.

3.1.8 Excavation to desired gradients in case of trenches.

3.1.9 Extra excavation beyond drawing/specification for necessary working space, for safety requirements and other allied works including back filling and compacting the same.

3.1.10 Removal of the surplus excavated earth, to the specified location as directed and leveling

the same.

3.1.11 Filling with cement concrete (with stone aggregate) M5B and well rammed in position, all excavation taken down below the proper levels due to carelessness of the Contractor.

3.1.12 Sprinkling of sand and water over final bed and ramming the same before laying soling and concrete.

3.1.13 Filling/Back filling with excavated earth or from spoil heaps shall include the excavation/re-excavation from such sources all /re-handling and removing un-wanted materials from the soil.

3.1.14 Compacting, leveling, watering, trimming to levels, profiles and gradient as per drawing, specification and/or as directed.

3.1.15 Cost of all tests, as specified and/or as directed for the filling/back filling works.

3.2 TECHNICAL CLARIFICATION

3.2.1 Location for disposal of surplus excavated materials will be decided at site during execution so as to avoid re-handling.

3.2.2 All kinds of soil shall mean ordinary, hard soil and soft/decomposed rock (including laterite) as per classification of soil mentioned in the Tech. Specification excepting hard rock to be paid under separate Item.

4.0 CONCRETE (PLAIN AND REINFORCED)

The rate of the respective item shall also include, but not limited to the following as described hereinafter in different Sub-Heads.

4.1 CONCRETE

4.1.1 Setting out all works from reference axes and bench marks.

4.1.2 Cleaning, washing and screening of aggregates whenever necessary.

4.1.3 Dewatering of all foundations and areas during concreting.

4.1.4 Cement slurry/cement mortar slurry at construction joints and cold joints.

4.1.5 Provision of Building paper and bearing plaster at bearing of slabs resting over walls.

4.1.6 All the appropriate provisions as stipulated in the specification of concrete chapter for materials, Design Mix, Preparatory works/surface preparation for concreting, facilities for checking, batching, mixing, transportation, placing and compaction of concrete, requirements in special cases of concreting, appropriate finishes to exposed surface, curing by appropriate means, all types of testing including hydraulic testing for Reservoirs, water tank etc. as directed.

4.1.7 Provision of construction joint (water bar excludes) and surface preparation of construction

joint and cold joint, before placement of concrete.

4.1.8 Provision of chases, holes/openings as per drawing and grouting with cement mortar as directed.

4.1.9 Cleaning all anchor holes and keeping them, covered.

4.1.10 Protection of the structures/premises, foundations till final handing over and keeping the premises, basement, etc. dry.

4.1.11 The hacking or roughening the exposed surface to receive plaster or where it is to be joined with brick masonry wall.

4.1.12 Providing moulding, throating, drip course, etc. unless mentioned otherwise in Schedule of Item.

4.2 REINFORCEMENT

4.2.1 Cleaning and protection of reinforcements and decoiling and straightening of bars, if required.

4.2.2 Provision of chairs, spacer bars, incidental welding, spacer blocks, binding wires, etc.

4.3 CONCRETE PAVEMENT

Brief description of major items shall be as follows:

a) Earth Work in excavation including back filling and disposal of surplus earth.

b) Providing shuttering and strutting of all types.

c) RCC M25 as per drawing & specification along with reinforcement (supply of cement, coarse aggregate, fine aggregate, reinforcement bars), reinforcement bending, placement, binding/ welding all inclusive & testing of concrete and other materials.

d) Providing and laying 150 mm thick reinforced cement concrete of (M-25 grade) with 20mm and down grade crushed stone aggregate in pavement, including preparation of base (i.e. compacted subgrade, supply and laying 200 thk sand and 100 thk PCC M-10).

e) Providing pockets if necessary, making recesses, trenches with precast covers/ gratings, fixing inserts, conduit pipes (GI, PVC, HDPE, etc.) laying in alternate panels, filling the gaps between the panels with bitumen sand mix etc.

f) Provision of chequered plates into permanent works as per SOR item of Structural works.

g) Making slopes, finishing edges, leaving bars for pedestals & sleepers including providing sand fill isolation.

h) Providing and fixing reinforcing steel (in one / two layers), curing, chipping and modification works etc. as specified in any shape, thickness, position and finishing the top surface smooth as per requirement etc. all complete as per drawings, specifications and directions of the Engineer-in-charge.

i) Application of two coats of hot bitumen on surfaces in contact with soil.

j) Actual work shall be carried out as per certified construction drawings to be issued to successful tenderer.

Note: Payment shall be made as per net area in SQM as laid at site.

5.0 AAC BLOCK MASONARY WORKS

Complete works in brick masonry in sub structure and AAC block masonry in superstructure is included in the scope.

5.1 SPECIFICATION TO ACC BLOCKS

Autoclaved Aerated Concrete (AAC) is a light weight cellular material which is formed by a chemical reaction between fine grained calcareous and siliceous materials. Calcareous materials include lime and/or cement whereas siliceous materials generally used are natural or ground sand and/or industrial by products such as slag and Pulverised Fuel Ash (PFA). The cellular structure which gives the product good thermal properties and a high strength density ratio, is produced by reaction between alkaline lime/OPC component and added aluminium powder (foaming agent) to give bubbles of hydrogen. The curing of this type of concrete is done at high temperature and pressure in saturated steam (Autoclaving).

AAC blocks are used in solid and cavity wall construction, partitions, panel walls, inner leaf of cavity wall or a backing to brick masonry

Speed of construction, saving in jointing mortar, attractive appearance, design versatility, good and strong binding are some of the merits of AAC block masonry.

AUTO CLAVED AERATED CONCRETE (AAC) BLOCK PROPERTIES:

PROPERTIES	VALUES
Density (Oven Dry) Compressive Strength	551-750 Kg/Cum As per IS 2185 part (III) not less than 3Mpa

Relevant IS Standards:

BIS - 2185 (III)- 1984 : Autoclaved Aerated Concrete Block.
BIS - 6041 - 1985 : Construction of Autoclaved Aerated Concrete Block Masonry.
BIS - 6441 - 1972 : Methods of Test for Autoclaved Cellular Concrete Product.

5.1.1 STORAGE OF MATERIAL

The blocks shall be stored on the site on a level ground and to be protected against rain

fall and snow fall. .

5.1.2 THIN BED MORTAR:

Polymer modified adhesive shall be used for laying of blocks with adhesive tensile strength not less than 0.34Mpa as per ASTM C1660.The thickness of mortar bed is around 2-3mm as per suppliers' specification.

5.1.3 SOAKING AND WETTING OF BLOCKS:

These blocks shall not be soaked prior to laying in the wall. Only slight wetting is required.

5.1.6 LAYING BLOCK MASONRY:

Laying of AAC Block masonry shall be in accordance with the recommendations of IS 6041 of 1985 and IS 1905 OF 1987.

The laying of block may be started either at the corners first or it may be started from one end and proceed to the other direction. The first course of the cellular block masonry shall be laid with greater care, making sure that it is properly aligned, leveled and plumbed, as this may assist the mason in laying succeeding courses to obtain a straight and truly vertical wall.

The design of wall should be such that cutting of blocks is minimized when leaving space for door and windows.

5.1.7 SLENDERNESS RATIO:

Design of AAC block masonry is based on the same parameters as that of brick masonry, as Indian Standard BIS: 1905 (masonry code) applicable to brick masonry is also applicable with the same provisions to AAC block masonry. Therefore, slenderness ratio of AAC masonry walls shall be as per guide lines of Indian Standard for masonry walls.

5.1.8 CHASES

Guide lines for chases is masonry walls as per Indian Standard BIS:1905 need to be followed. The cutting of chases, recesses etc. should be done with out damage to the surrounding masonry. It is desirable to use such tools for cutting which depend upon rotary motion not on heavy impact for cutting action.

5.1.9 FIXTURES IN AAC:

Doors and windows

Cracks in walls at the corner of doors and windows frames at lintel level or sill level. It is

desirable to provide nominal reinforced concrete bond beam at sill and lintel level and vertical reinforced concrete stud at either side of vertical members of door & windows frames which may provide additional anchorage for the holdfast.

5.1.10 PRECAUTIONS & MAINTAINENCE

Laying of AAC block masonry shall be in accordance with the recommendations of IS 6041 of 1985 and IS 1905 of 1987.

Provision of nominal bond beams serves the means of crack control for AAC masonry work. Nominal bond beam shall be built in the same manner as the structural bond beam with a minimum reinforcement of two 8mm dia mild steel bars. In walls without openings they shall be placed 1200mm apart. In walls with opening it shall be provided at sill and lintel level.

The laying of block may be started either at the corners first or it may be started from one end and proceed to the other direction.

The first course of the cellular block masonry shall be laid with great care, making sure that it is properly aligned, leveled and plumbed, as this may assist the mason in laying succeeding courses to obtain a straight and truly vertical wall.

The exposed wall shall be inspected closely every year before monsoon and cracks if any shall be sealed properly with a non-shrink cement grout and painted with two coats of cement paint.

6.0 SOAK PIT, SEPTIC TANK & SEWARAGE SYSTEM

Complete works for the making and proper functioning of soak pit and septic tank is included in the scope:

Brief description of major items shall be as follows:

a) Earth work in excavation, back filling, and disposal of surplus earth.
b) 150 thk PCC M-10
c) Brick work 1:5.
d) Plaster 12 mm thick 1:3 in coarse sand, finished with floating coat of neat cement inside and rough plaster outside.
e) Brick bat filling in soak pit.
f) Honey comb brick work in soak pit.
g) RCC M-25 including reinforcement, shuttering etc in top slab.
h) Making all types of connections for sewerage collection (both internal and external) and disposal.
i) Providing and fixing cast iron vent pipe up to required height as per drawing. Note:

1. Soak pit and septic tank shall be provided inclusive of all related works, as per approved detailed drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per installation)

7.0 BRICK MASONRY

The rate of the respective items shall be for the complete finished work and shall also include, but not limited to the following bye works/activities all complete at all levels and locations and as per specification and as directed by the E-I/C.

a. Setting out the works as per drawings.
b. Dewatering during works in foundations and in some particular cases, if found necessary.
c. Provision of scaffolding, platform, ladder, etc. including all necessary safety measures and accessibility and removal of the same.
d. Necessary surface preparation of dissimilar materials for proper bonding with masonry works as specified and as directed.
e. Providing opening/holes/voids/pockets for which no deduction is made in the measurement.
f. Extra provision necessary in ends of beams, joints, slabs and the like, with necessary levelling.
g. Raking of joints, as the work proceeds.
h. Bedding for plates, lintels, corrugated sheets and the like with necessary levelling.
i. Extra provisions necessary for projection, string course, sills, jambs, soffits of openings.
j. Curing by appropriate means.
k. Provision of metal pins, dowels, cramps, etc. for stone veneering.
l. Provision of necessary form work, template and centering in case of arches.
m. Removal of unused materials, dirts, debris, etc. and clearing the above after completing the work in particular area, if required.
n. Provision for drainage holes and recesses for cement concrete blocks, to embed holdfasts for door, windows, etc.
o. Chases and holes for sanitary and other service viz. sanitary and electrical fittings, hangers for pipes and cables support and for call bells, clamps for light and fans, etc. as shown in drawing or as directed.

8. FLOORING AND PAVING/PAVEMENTS

The rate shall include, but not limited to the following:

a. Preparation of the base/sub grade before laying the flooring.
b. Provision of the under course including the required surface preparation.
c. Provision of dividing strips wherever required.
d. Provision of small channels, grooves etc.
e. Curing by appropriate means.
f. Working in isolated areas.
g. Necessary rectification to damages.
h. Protecting the floor till final handing over and maintaining the same within the maintenance periods.
i. Provision of necessary panels to prevent construction cracks.
j. Provision of expansion and contraction Joints.
k. Flooring in discontinuous strips or areas to suit the needs.
l. Providing necessary pes as desire and rectification wherever any flooring is anti-slope.

LIST OF PREFERRED MAKES/BRAND AND/OR MANUFACTURE

LIST OF MATERIALS OF PREFERRED MAKES/BRAND AND/OR MANUFACTURE

Preferred makes of materials to be used in the work are as given in the table below. In case of non-availability of these makes, the Engineer-in-charge may allow use of alternative makes after seeking approval through Concession/Deviation Request Form. Only BIS marked materials shall be generally used in the work.

A) LIST OF PREFERRED MAKES FOR CIVIL WORKS

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SL. No	MATERIAL	PREFERRED MAKES/ BRANDS/ MANUFACTURES
1	CEMENT **	ULTRATECH, ACC, AMBUJA, SHREE, DALMIA, JK, BIRLA, STAR CEMENT, MEGHALAYA CEMENT
2	REINFORCEMENT STEEL**	SAIL, TATA STEEL, RINL, JSW STEEL LTD, JINDAL STEEL LIMITED, SHAKAMBHARI, SRMB, SHYAM STEEL
3	CONSTRUCTION CHEMICALS/ ADMIXTURES / CORROSION INHIBITORS/ GROUTS	FOSROC, SIKA, STP LIMITED, CICO, CHRYSO, BASF, PIDILITE
4	CHEMICAL FOR ANTI-TERMITE TREATMENT	RENTOKIL PCI, BIFLEX TC
5	WATER PROOFING COMPOUND	FOSROC, SIKA, STP LIMITED, BASF, PIDILITE
6	NON-METALLIC SURFACE HARDENERS	FOSROC, SIKA, STP LIMITED
7	ANCHOR FASTENERS	HILTI, BOSCH, FISCHER
8	POLYSULPHIDE SEALANT	FOSROC, SIKA, PIDILITE, CHOKSEY
9	EXPANSION FILLER BOARD	SHAILITEX, SIKA, STP LIMITED, SUPREME
10	GI PIPE	TATA STEEL, JINDAL STEEL LIMITED, SURYA ROSHNI LIMITED
11	UPVC/CPVC PIPE & FITTINGS	SUPREME, FINOLEX, KISAN, ASTRAL, PRINCE
12	CENTRIFUGALLY CAST CI PIPES	KESORAM, ELECTRO STEEL CASTINGS LTD, NECO, JINDAL SAW, SKF

***** - Project Specific Preferred Make***

Notes -

1. In case the items listed above are not available in the market or in case of change in trade name, equivalent makes/ re-designated manufacturer shall be used with prior approval of Engineer-in-charge.
2. Any materials not fully specified in this specification and which may be offered for use in the works shall be subject to approval of Engineer-in-charge.
3. In case of some items not covered in this list like fasteners, fixtures etc. may be procured from the market conforming to IS codes with test certificates and prior approval from Engineer-in-charge.

SCOPE OF WORK

FOR

ARCHITECTURAL WORKS

I) GENERAL

II) SCOPE OF WORK –As per Civil Particular job specification

III) DRAWINGS

The work shall be executed in accordance with the specification and the drawings issued for construction. Drawings will be issued in stages in close coordination with the availability of data and sequence of construction. Only latest revisions of the drawings shall be followed. All old revisions shall be clearly marked 'SUPERCEEDED' and kept separately or destroyed as directed by consultant.

IV) SITE RECORDS

All works shall be recorded in appropriate proforma to be firmed up by the contractor in consultation with the Consultant. Where ever required reference to drawings and clauses of specification shall be recorded in the correspondence.

Records of cement and steel receipts, issue, and consumption shall be scrutinized from time to time by consultants and Owner. Statement of cement and steel receipts, statement of theoretical consumption and reconciliation accompany every bill. Records of spot levels jointly recorded before the start of the work shall form the basis of all measurements.

V) APPROVAL AND TESTS

A high standard of quality is required for all materials and workmanship in construction work. They shall be best of the kind obtainable indigenously in each case and shall be procured from manufacturers of repute in order to ensure uniformity of quality and timely supply.

All materials shall be subjected to inspection and testing. The Contractor shall submit samples for testing as may be required by the Consultant. Sampling and testing shall be carried out in accordance with relevant IS Standards.

Wherever IS codes are referred, they shall be latest edition/ publication as on date irrespective of the date of finalization of the work.

VI) REJECTION OF MATERIALS

Any material brought to site which, in the opinion of the Consultant is damaged, contaminated, deteriorated or does not comply with the requirement of this specification shall be rejected.

If the routine tests or random site tests show that any of the materials, brought to site, do not comply in any way with the requirements of this specification or of IS codes as applicable, then that material shall be rejected.

The Contractor at his own cost shall remove from site any and all such rejected material within the time specified by the Consultant.

VII) PREAMBLE TO SCHEDULE OF ITEMS

1.0 GENERAL

This preamble to the schedule of items is an integral part of the schedule and shall have as much force as though this is incorporated into the description of the items themselves.

Contractor's rate for any items of work in the schedule of items shall, unless otherwise stated, be held to include the cost of all materials, including wastages, conveyance and delivery, unloading, storing, fabrication, hoisting, all labour for finishing to required shape and size, tools and plants, power, fuel, consumables, all taxes royalties, other revenue expenses, temporary facilities like roads, drains etc., providing temporary storage facilities for cement, steel and other materials and their subsequent dismantling, scaffolding and other temporary works, setting out, fitting and fixing in position, site drainage, dewatering, offering samples for approval, cost of all tests, rectification of all defects, replacement of defective materials and work, interruptions to work required to accommodate the work of other agencies working on the site, continuation of work beyond working hour, in the night and holidays also if situation warrants so, site clearance on completion, maintenance work during the period of maintenance, bye-work necessary to complete any particular item of work as per specification and direction of the E-I/C, overheads, profit and other incidental charges.

2.0 PLASTERING AND FINISHING

The rate of the respective item shall be for the complete finished work and shall also include, but not limited to, the following bye-works/activities all complete at all level and locations and as per specification and as directed by the E-I/C.

2.1 Preparation of surface to receive plaster/finish etc. cleaning of masonry/concrete surface of all dust, loose mortar dropping, traces of algae efflorescence and other foreign matter and roughening by wire brushing or hacking as may be required and raking out of joints where required.

2.2 Provision for scaffolding wherever required and removing the same.

2.3 Extra provision necessary to provide plastering /finishing in layers, when required.

2.4 All extra provisions necessary for plastering/surface finish in arises, bonds, bends, closing chases, rounded angles, drip courses, string courses, around openings/holes, and around dissimilar materials like metallic/timber/asbestos.

2.5 Nominal sprinkling of the cement slurry on the surface for proper grip and satisfactory finishing of the plaster work, if required.

2.6 Providing richer mortar 1:3 in a width of 75 mm on either sides of arises of all doors and windows.

2.7 All provisions necessary to achieve levels and true profiles.

2.8 Curing by appropriate means.

2.9 Removal of unused materials, dirts and debris and cleaning of area thoroughly, after completion of the work in particular area, if required.

3.0 PAINTING

The rate of the respective items shall be for the complete finished work and shall also include, but not limited to, the following bye-works/activities at all levels and locations and complete in all respects as per specification and as directed by the E-I/C.

3.1 Preparing the base surface including necessary rectification and treatment.
3.2 Provision of surface ladders, scaffolding etc., wherever necessary.
3.3 Provision of prime coat wherever applicable.
3.4 Curing by appropriate means wherever applicable.
3.5 Cleaning the splashes and drippings on floors, equipments, pipelines, etc.
3.6 Additional work to rectify the improper workmanship especially if final finish is not satisfactory.
3.7 Protection of painted surface during application and till final handing over.
3.8 Provision of brushes, abrasive papers, indigo (neel) and gum.

4.0 FLOORING, PAVING AND FACING

The rate shall include, but not limited to the following:

4.1 Preparation of the base/sub grade before laying the flooring.
4.2 Provision of the under course (where applicable) including the required surface preparation.
4.3 Provision of dividing strips wherever required.
4.4 Provision of necessary covers, chambers, edging, roundings, and the like in the junction of floors with dado/skirting/other vertical surfaces, around the pipes/openings/ends and other types of like cases.
4.5 Provision of small channels, grooves and the like.
4.6 Curing by appropriate means.
4.7 Provision of backing in case of linoleum/rubber/PVC/or similar flooring.
4.8 Working in isolated areas.
4.9 Provision of grinding and polishing when specified.
4.10 Necessary rectification to damages.
4.11 Protecting the floor till final handing over and maintaining the same within the maintenance period.
4.12 Additional thickness, the thickness mentioned shall be finished and minimum.
4.13 Applying cement slurry on the sub-base/structural slab before flooring to have a proper grip.
4.14 Provision of necessary panels to prevent construction cracks.
4.15 Finishing the surface ribbed or chequered or laid to falls if so desired.
4.16 Flooring in discontinuous strips or areas to suit the needs.
4.17 Providing necessary slopes as desired and rectification wherever any flooring is antislope.
4.18 Providing nosing at plinths, sills and steps etc. of so desired.

5.0 WOOD WORKS

The rate shall include, but not limited to, the following:

5.1 **Frames and Scantlings**

5.1.1 Making necessary holes/openings in masonry/concrete for fixing and jamming the same with appropriate materials.
5.1.2 Provision of bituminous coatings or other anticorrosive paint coatings on the surface in contact with concrete/masonry.
5.1.3 Provision of rawl plugs, screws, nails, pins, adhesives and the like, necessary for joinery and fixing.
5.1.4 Provision of temporary wooden bracings and their removal.
5.1.5 Provision of rebates, roundings and other type of curvings as per drawing.

5.2 **Shutters**

5.2.1 Provision of necessary wooden cleats, wooden blocks, with necessary screws, nails, adhesives, etc.
5.2.2 Provision for mouldings, rebates, roundings and other types of curvings as per drawings.
5.2.3 Provision of all necessary nails, screws, washers, holts, nuts, putties, adhesives, etc.

5.3 **General**

5.3.1 Provision of finishing as desired and directed by the E-I/C.
5.3.2 Rectification of damages and/or replacement of defective/rejected works.
5.3.3 Provision of protection till final handing over and maintaining the same within the maintenance period.

6.0 METAL DOORS, WINDOWS, VENTILATORS, ROLLING SHUTTERS

The rate shall include, but not limited to, the following:

6.1 Making necessary holes/openings in masonry/concrete for fixing and jamming the same with approved materials.
6.2 Shop fitting, assembly and shop coat of primer.
6.3 Doors, windows, gates, rolling shutters, glazed doors and windows and other items which are measured in Sq.m shall include all the necessary frames, angles, plates, sheets, holdfasts or lugs, locking arrangements, handles, bolting devices on both sides, hinges, pivots, guide rails and guide channels (wherever applicable), roller (wherever applicable), hood (wherever applicable), rubber linings, gaskets and the similar other fixtures necessary for fixing and locking arrangements (locks shall be separately paid unless otherwise mentioned in particular schedule of items).
6.4 Glazed doors/windows shall also include the glazing/glass panes glazing beads, glazing clips, putty, gasket and the like.
6.5 Rectification of damages and/or replacement of defective/rejected works.
6.6 Provision of protective measures till final handing over and protection/maintenance of the same within the maintenance period. Protection of glass panes/glazing after final hand over shall be the responsibility of the E-I/C.
6.7 Keeping the entire steel work free from corrosion and scrapping off and cleaning the rust, if any.

VIII) GENERAL ARCHITECTURAL CONSIDERATIONS

This part deals with the general norms/standards requirements of materials for use in construction work with regard to quality, testing, approval and storage, before they are used on work.

1. Standard

A high standard of quality is required for all materials used in construction work. They shall be the best of the kind obtainable indigenously in each case and shall be procured from manufacturers of repute in order to ensure uniformity of quality and assurance of timely supply.

2. Space Requirements

- Buildings shall accommodate spaces to meet the functional requirements as well as security/safety, maintenance, statutory (stairs/fire exits etc.), utilities & services (toilets/AC/Electrics/LAN/health etc.)/ environmental requirements and incorporated in design & detail engineering drawings/documents.
- Space requirements as indicated are not exhaustive and subjected to finalization by client during detail engineering stage with modifications required to meet the building requirements.

3. Design Requirements

- Entry to be provided at proper location.
- Toilet & Overhead water tank to be provided as per NBC guidelines.
- 600 mm projection to be provided over each window & ventilator.
- False ceiling to be considered in toilets for concealing pipes.
- Skirting shall be of same finish as that of floors. Panel dividers shall be provided in IPS/Heavy Duty flooring.
- All Air-Conditioned areas shall have false ceiling.
- Painting on Internal walls shall be done over wall putty.
- All steel frames, Shutters, Grills etc shall be painted with two or more coats of approved quality Synthetic Enamel Paint of Approved shade over a coat of Approved quality red oxide Zinc Chromate Primer.
- False flooring shall be provided in IT/ Server Rooms.
- Samples, colour, finish and make of all materials should be approved by client.
- Metal fire door, 120 minutes as per specifications/Fire Norms/NBC-2016

4. Natural Ventilation

The area of windows will be a minimum 17% of the floor area to ensure adequate natural lighting and ventilation.

5. FLOORING

5.1 Vitrified / Ceramic Tile Flooring

Polished / glazed Vitrified floor tiles of approved make/ shade/ design/range of size as per Arch SOR shall be provided in SCADA & Control Room, Telecom Roo, Office spaces and corridors.

Heavy Duty Vitrified floor tiles of approved make/ shade/ design/range of size 300mm X 300mm and 12mm thickness shall be provided in Electrical Room and Fire Fighting Room.
Ceramic glazed/matte finish wall tile of size 600mm x 300mm of approved make shall be provided in toilet dado and matt finish/ anti-skid ceramic tiles of size 300mm x 300mm for toilet flooring.

5.2 Kota Stone Flooring

Kota stone slab flooring of 25mm thickness shall be provided in guard rooms, utility areas, stores, staircases, window sills, etc.

5.3 Acid-resistant Tile Flooring

Acid resistant tiles shall be provided in floor and dado upto lintel level of battery rooms of size 300mm x 300mm.
Acid Resistant Tiles are used in flooring and lining to prevent corrosion of surface by acids and other chemicals as well as to resist abrasion on floors. These tiles are made up of materials like clay, feldspar, quartz, and talc and vitrified at high temperatures in ceramic kilns and kept unglazed to prevent slipperiness when laid on floor. Chemical resistant mortars as per IS 4832 are used for laying these tiles. Laying and finishing procedure similar to the other glazed ceramic tiles.

5.4 False Flooring

Telecom Room and Control Room may have false flooring as per requirement.

Providing and fixing noncombustible 600mm high false flooring / cavity floor of modular 600 x 600 size and min thickness of 35mm approximate with pre moulded (USF 1000 grade) in filled access floor tile made from steel and cementitious infill material (M/S Unitile or equivalent), with edge beading and faced with 2 mm thick antistatic high pressure laminates. The Panels shall confirm to Class O & Class 1 Fire Ratings tested as per BS 476 and ASTM E84. The panel shall be designed for minimum concentrated load of 450 kgs, ultimate concentrated load of 1050 Kgs, Rolling load of 225 kgs.
The other components such as stringers, pedestals, supports, check nuts, etc shall be designed suitable in-line with the design parameter of the false floor panel.
The panels shall be placed on GI snap lock grid system stringers channels supported over MS galvanized pedestal supports at 600mm c/c approximate both ways.
Jack heads shall be die formed, out of min 4mm thick galvanized M.S. plate out of 90 mm X 90 mm, electroplated, with die cut notches to hold stringers ‘snap on’ and threaded holes, in addition, to hold the rigid grid type stringers. The jack heads shall have stud for housing into the pedestal. The pedestal head shall consist of an anti-vibrational conductive cap
Stringers shall be M.S. rigid grid type minimum 30 mm X 20 mm X 1.2 mm thick tubes and shall rest on the jack heads notches and shall be fixed by means of screws. The stringers shall be spray painted with conductive paint or galvanized to prevent rust & corrosion.
The pedestal supports shall be rigidly fixed on to the floor with glue and mechanical fasteners and shall be made of 150 x 150 mmx 8mm thick base plate with CRC pipe of size 32mm dia X 3mm and minimum 19 mm thick MS stools with a coupling and check nut for level adjustment. The sub structure assembly shall be suitably anchored to the floor.
The work includes necessary opening for cables and panel mounting and cutting of tiles to

required size and strengthening of pedestals with 300 x 300 mm RCC pedestal at location of panals. The floor panels and stringers shall be completely removable and shall remain in position without screwing. The shade of the flooring material shall be as specified in the drawing or as directed by Engineer.

6. Finishing

6.1 Plastering on masonry structures shall be of thickness 15 mm on either faces, 12mm on internal faces & 6mm on concrete faces. The cement mortar shall not be leaner than 1:4.

6.2 Inside surfaces of walls /Ceiling will be provided with 1.5 mm thick plaster of paris / Wall putty of approved brand over the plastered surfaces.

6.3 All painting on masonry or concrete surface shall preferably be applied by roller. If applied by brush then same shall be finished off with roller.

6.4 All paints shall be of approved make including chemical resistant paint.

6.5 All internal walls shall be finished with Premium Acrylic Smooth Interior Paint
Minimum 2 finishing coats of paint shall be applied over a coat of primer. Providing and Applying of painting on internal plastered surfaces with two coats of acrylic emulsion - Eco friendly paint with low Volatile Organic Compounds (not exceeding 50 g/L) of approved shade & make, over one coat of approved cement primer consisting of volatile organic compounds less than 50g/L, including preparing the surfaces by applying Wall Care Putty (Fine finish) or approved equivalent make 1.5 mm thick, surface preparation, cleaning and all bye works, filling hair cracks with putty approved filler wherever 'required, scaffolding & cleaning, cost of all materials, labour etc. at all heights and lifts, all as per drawing, specifications and as directed by Engineer In-charge etc. complete.

6.6 All external walls shall be finished with Acrylic Exterior Paint
The paint should be applied in minimum 2 coats (Eco friendly paint with low Volatile Organic Compounds not exceeding 50 g/L) @1.67 litre/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm, on new plastered surfaces inclusive of all required tools, material, scaffolding and other painting accessories etc. The paint shall be applied as per the manufacturer's specifications and instructions and to the entire satisfaction of engineer-in-charge. The paint shall have excellent water-resistant property.

6.7 For painting on concrete, masonry and plastered surface IS: 2395 shall be followed.

6.8 Surfaces of handrails, balustrades, steel / wooden door frames, rolling shutters, etc. shall be finished with synthetic enamel paint (eco-friendly paint with low Volatile Organic Compounds) over a coat of primer of approved shade & make.
For painting on steel work and ferrous metals, BS: 5493 and IS: 1477 shall be followed. The type of surface preparation, thickness and type of primer, intermediate and finishing paint shall be according to the painting system adopted.

6.9 For painting on wood work IS: 2338 shall be followed.

6.10 Bitumen primer used in acid/alkali resistant treatment shall conform to IS: 158.

6.11 **Blast resistant buildings shall be as per OISD 163**

7.0 DOORS AND WINDOWS

7.1 Aluminium Doors, Windows and Ventilators

Glazed anodized Aluminium door with Aluminium frame of approved sections at specified areas. 8-12 mm thick toughened glass with Etching shall be considered with top & bottom

Aluminium frame. Doors of the building shall be anodized aluminium environmentally compatible products containing minimum of 15 to 25 % of recycled content of approved coating (colour to be approved by Designer) fully / partially glazed (float glass panes with thickness as per opening with/without SHGC 0.25 to 3 and required U Value as per design. Doors shall have 8.0mm minimum thick float glass(with or without etching design) panels or prelaminated board panels with decorative lamination on both sides of approved make fixed with C.P. brass / stainless steel screws hydraulic door closer/ etc. complete as per directions of E-I/C ; frames as per approved manufacturer's detail. The item shall include heavy duty double action hydraulic floor springs with stainless steel cover plate of approved make with IS: 6315 mark, pivoting and all other arrangements including cost of cutting floors, S.S cover Plates with brass pivots etc., complete and other necessary accessories required for the works to facilitate smooth operation of the door shutter at all leads and lifts, all as directed by the Engineer- in- charge.

All windows/ ventilators shall be aluminium glazed (min. 5mm thick glass with/without SHGC & U Value as per design) with anodized aluminium hardware & aluminium grill as per requirement. The windows/ ventilators shall be partially/ fully openable or sliding windows as per requirement. All openings for door with aluminium louvers, windows & ventilators shall have high grade wire mesh/mosquito net. The fixtures like handles, stoppers, stays, etc. shall be of approved make. All aluminium sections/sheets including louvers shall be of standard make. Aluminium alloy used in the manufacture of extruded sections shall correspond to IS Designation H E 9 WP of IS 733. Hollow aluminium alloy sections used shall conform to IS Designation HV9 WP of IS 1285. The sections shall be polished and anodized with approved colour. The average thickness of anodic coating shall not be less than 20 microns as per IS: 1868-1982. All work shall be fitted and shop assembled to a first job, and ready for erection. EDPM performed profiles shall be used for inserting into extruded pockets of sections. Glazing beads shall also be of EDPM performed profiles to hold the glass in frame under pressure. Non-metallic setting blocks shall be used to centralize the glass in frame. All work shall be adequately braced and reinforced as necessary for strength and rigidity. Stainless steel ball bearings, housed in nylon type nylon rollers, shall be used. All mechanical connections shall be sealed with silicon sealant. Around all windows, approved quality sealants shall be run down to make sure of total weather/water sealing.

Casement windows / ventilators, single or composite units with 6.0mm thick float/frosted glass, frame size of 44mm x 46mm x 1.1mm, weight 0.522 kg/m min. amd middle frame (horizontal & vertical) 59mm x 38mm x 1.4mm, weight 0.729 kg/m min(approx.), as per approved manufacturer’s detail. Openable portion, section size 44mm x 46mm x 1.4 mm, weight 0.575 kg/m min. as per approved drawing and as per approved manufacturer’s specification.

Composite sliding windows with fixed and openable portion, fixed to frame size min. 101.6mm X 44.45mm x 2.01mm, weight 1.605 kg/m (approx.) and 63.5mm x 38.1mm x 1.5mm, weight 0.861 kg/m min. as per requirement. Sliding shutters fixed to frame size 92mm X 31.75mm x 1.5mm min. & weight 1.060 kg/m min and 61.85mm x 31.75mm x 1.5mm, wt. 0.784 kg/m min as per requirement. Shutter side, bottom and interlock shall be 40mm x 18mm x 1.55mm wt. 0547kg/m min., as per approved drawing and as per approved manufacturer’s detail.

7.2 PVC Doors

Toilets may have PVC doors of premium quality with solid PVC foam profile door frame.

PVC door frame shall be factory made (single rebate) made out of single piece extruded solid PVC foam profile with homogenous fine cellular structure having smooth outer integral skin

having 62 mm width & 32 mm thickness, frame will be mitred & jointed with self-driven self-tapping screws of size 38 mm x 4 mm & PVC solvent cement, including fixing the frame to wall with suitable dia & length anchor fastener as per manufacturer's specification and direction of Engineer-in-charge.
The door shutter shall be factory made 30 mm thick non decorative finish made of solid PVC foam profile. The styles & rails shall be of size 75 mm x 30 mm having wall thickness 5 mm. The styles, top & bottom rails shall have one side wall thickness of 15 mm integrally extruded on the hinge side of the profile for better screw holding power. The styles and rails shall be reinforced with M.S. tubes of size 33 mm x 17 mm x 1 mm, painted with primer, all four corners of reinforcement to be welded or sealed. Solid PVC extruded bidding (push fit type) will be set inside the styles and the rails with a cavity, to receive single piece extruded 5 mm PVC sheet as panel. The styles and rails will be mitred cut and joint with the help of PVC solvent cement & self-driven self-tapping screws. Single piece extruded solid PVC lock rail of size 100 mm x 30 mm with wall thickness 5 mm & 15 mm integrally extruded in the middle of the lock rail & fixed with styles with the help of PVC solvent cement & self-driven self-tapping screws of size 100 mm x 8 mm complete as per manufacturer's specifications and direction of Engineer-in-charge.

7.3 Rolling Shutter

M.S. Rolling Shutter as required to be provided as per IS code and finished with synthetic enamel paint.

8. FALSE CEILING

All specified spaces shall have false ceiling of ecofriendly, light weight metal false ceiling tiles and gypsum board false ceiling.

8.1 Calcium Silicate False Ceiling

Material
Frame:
The frame work shall consist of G.I. Pre-coated Silhouette Profile ' T ' Sections for Main runners / Cross runners of size & thickness specified in the item with galvanization of 120 gsm (minimum),and perimeter w-profile of 0.40mm (minimum thickness) having flanges of size 7mm + 7mm+19mm made from precoated polyester baked Coil length of 3.0/3.60M.fixed to the wall with the help of rawl plugs at 450mm centre to centre with 35x8mm long dry wall wooden screws with virgin plastic rawl plugs@ 450mm interval. The frame work shall be executed in a manner so as to form a grid of 600mm x 600mm as specified in the item. The frame work shall be suspended from ceiling by L shape adjuster hangers made of G.I. sheet of size 85x25x25x2mm having die cut slit for sliding into main T section, also having precut hole so as the 6mm fully threaded MS rod can be inserted and pierces into M 6 dash fasteners of 6 mm dia 40mm long, fixed to the slab/beam and then tightened with check nuts, subsequently the bottom of 6 mm rod will be tightened with check nuts, for adjusting the line & level, in true horizontal plane.
Ceiling Tiles:

Ceiling Tiles shall be of 15 mm thick Integral densified microlook edged, semi perforated / fully perforated or with design/ texture as mentioned in item, eco friendly light weight calcium silicate false ceiling tiles and made from hydrated calcium silicate, reinforcing fibres, natural fillers free from formaldehyde and other harmful materials, & shall not contain any toxic ingredients and shall have 52% recycled material, including 23% fly ash.
The tile shall be of size 595 x 595mm having Integral densified reinforced edges of 15 mm thickness all around with a collar of width 24 mm and 10mm thickness at the centre. The tiles shall have overall density of 350 kg/m3 in the body and 450kg/m3 at the edges. The tiles shall be primer coated on both sides and the fair surface shall be having factory finish in two coats of white dispersion type solvent free paint.
The calcium silicate tiles should be eco-friendly light weight, characterized with 100% relative humidity resistance, non-combustibility as per BS 476 Part IV, thermal conductivity of < 0.043 w/m°kc as per ECBC Code-2007, light reflectance> 85°/0,and Noise Reduction Coefficient (NRC) of 0.50 for Spintone / Cosmos /Fine Fissured and NRC of 0.15 for Hexa/Quadra , and NRC of 0.65 to 0.75 for Globe fully perforated tiles, as per IS-8225-1987. Sound attenuation STA- 32 dB. The tiles should weigh approx 5.0--5.5 kg/m2.

Suspension Material

G.I. Fully threaded galvanized rod of 6 mm dia. having hot dip coating of zinc 80g/ Sqm, and tensile strength of 344-413 MPa. The rod should be used in conjunction with L- adjuster, bent at 90°, and check nuts, so as to ensure that there is no disengagement, both at the bottom of rod and at the top portion which is tightened to M- 6 metal dash fastener, suitably drilled into the slab/beam.

Fixing of frame work and tiles

The main runner of size 42mmx15mmx0.40mm thickness 3.00m/3.60m length having a black/white reveal in silhouette profile spaced at 1200 mm centres, shall be securely suspended with G.I. Fully threaded rod of 6 mm dia. with L- type adjusters of 85x25x25x2mm made from G.I Sheet. The rod is to be be suspended from the soffit of slab/ beam at 1200 mm centre to centre with the aid of M6 dash fasteners, suitably drilled into the slab. The last hanger at the end of each main runner should not be greater than 600mm from the adjacent wall. Then flush fitting cross tees, also having a black/white reveal in silhouette profile of size 42mmx15mmx0.40mmthickness & 1.20m length are to be inserted in the main tees at 600mm centres at right angles to the main tees to form a grid of 600mm x 1200mm modules, Shorter cross tees of 42mmx15mmx0.40mm thickness & 600mm length are then to be centrally inserted in the longer cross tees in direction parallel to the main tee so as to form a grid of module 600mm x 600mm. The frame system shall rest on periphery walls/ partition on the w-profile of section 0.40 mm thick gauge having flanges of 7mm+7mm+19mm made from G.I coil length 3.0m/3.60m,.The entire grid system shall be designed to bear a distributed load of minimum 15kg/Sqm having galvanisation of 120 gsm (minimum). All tees shall be rotary stitched double-webbed and powder coated in white shade. The ceiling tiles shall be placed directly over the G.I 'T ' Section frame and not to be cemented nor glued to the surface of any other materials.

Precautions

a) All wet trades such as plastering, conduiting, and painting etc be completed prior to start of false ceiling works.
b) Air Conditioning duct work is to be completed, preferably even before the suspension of the grid sections.
c) Electrical chasing or drawing lines & cables, etc. are to be in place before start of false ceiling works.
d) No unauthorized weight is put on false ceiling. Lighting fixtures, diffuser are to be suspended independently with proper chains/ wire & dash fasteners as directed by Engineer in Charge.
e) The area should be completely dry, prior to ceiling installation work.

Measurements

Length & breadth of the finished ceiling shall be measured correct to a centimeter. The area shall be calculated in square meter correct to two decimal places. No deduction shall be made for making openings for electrical, air conditioning, fire fighting fixtures, nor shall extra payment be made either for extra materials or labour involved in making such openings.

8.2 Gypsum Board False Ceiling

Providing and fixing 12.5 mm thick moisture resistant gypsum board suspended false ceiling with M/F Suspended Ceiling Regular System (Single Layer GS-MFSC-4.1) which includes providing and fixing G.I. Perimeter channels of size 0.55 thick having one flange of 20 mm and another flange of 30 mm and a web of 27 mm along with perimeter of ceiling, screwed fixed to brickwall/partition with the help of nylon sleeves and screws, at 610 mm centres. Then supending G.I. intermediate channels of size 45 mm, 0.9 mm thick with two flanges of 15 mm each from the soffit at 1200 mm centres with ceiling angle of width 25mmx 10mm x 0.55mm thick fixed to soffit with G.I. cleat and steel expansion fasteners.
Finally the board are to be jointed and finished so as to have a flush look which includes filling and finishing the tapered and square edges of the board with jointing compound, paper tape of best quality and two coats of primer suitable for Gypsum board (as per recommended practices of Gypsum board or equivalent).The rate shall be inclusive for making necessary opening for light fittings, grills 12 and cutouts etc. with the frame of perimeter channels of size 20mmx27mmx30mmx0.55mm thick supported suitably and painting the exposed surface of Gypsum board two coats with plastic emulsion paint of approved brand and shade including making necessary service door complete in all respect as per manufacturer's specification as directed by E-IC.

9. ROOF AND ROOF DRAINAGE

9.1 Roof drainage system will be provided for quick and efficient draining of rainwater from roof to avoid seepage and damage to roof. The roof gradient for the roof will not be less than 1 in 100. Roof System will be designed to handle design requirements for the specific site and will be in accordance to stipulations of IS:1742 and IS:2527. Roof drains will conduct water to storm drains through uPVC down take pipes. UPVC Rain water conform to IS :

13592 Type A including jointing with seal ring conforming to IS : 5382 leaving 10 mm gap for thermal expansion Single socketed pipes.

9.2 All exposed RCC roofs shall have waterproofing treatment of acrylic base flexible liquid applied Waterproof cum Insulation Membrane. The surface shall then be finished with crazy ceramic tiles.

Method of Application

Surface Preparation

Prior to application of Waterproof cum Insulation Membrane, all surfaces must be prepared properly to avoid failure. The surface shall be cleaned to remove all dust, foreign materials/loose particles or any deposits of contaminants, which could affect the bond between the original substrate and the membrane system. This can be done by scarifying, grinding, water blasting, sand blasting, acid washing or any other approved method. Rectify depression / honey-comb (if any) in the surface, use mortar (1part mortar, 2part cement, 4 part medium washed sand) and leave it for at least 24 hours before application of Waterproof cum Insulation Membrane.

Treatment of Cracks

If there is any crack up to 2 mm, clean those cracks with vacuum cleaner, to open cracks, pour waterproof acrylic primer followed by a coat of acrylic along the crack line and leave it to dry for overnight.

Application of Primer

Though the membrane adheres strongly with most of building materials like cement concrete, mortar, bricks, woods, metal etc, use of acrylic primer provide better performance of final coating system. Stir well the Primer and apply it with soft nylon brush or roller over the dry surface. Generally, one coat is sufficient. If the surface is too porous apply two coats of primer. Time gap between two coats should be 2-3 hours.

Application of Membrane

After the application primer coat allow it to reach touch dry for 2-3 hours. Stir the material to a homogeneous smooth consistency and apply it horizontally with soft nylon brush, roller or squeeze to thickness of 125-150 microns in single coat. Allow it to dry for approx. 4-5 hours. When the applied coat becomes sufficiently dry (no foot print observed) apply second coat vertically. Two coats are sufficient for general application (150-200 microns DFT) but for severe conditions, three or more coats are required to achieve desired results.

Precautions

- Reinforcement rods and other sharp materials should not be dragged over the membrane, as this can puncture the same. The material shall always be used without dilution.
- Do not apply coating thickness more than 200 microns in one go. For higher coating thickness apply multiple coats.
- There should not be any rain during and after application of final coating for at least 6-8 hours.
- 24 Hours pond test shall be carried out after 72 hour of final coating application

10. MISCELLANEOUS WORKS

10.1 All staircases and corridors shall have m.s. railings. Handrail shall be of 66x33x3.6 M.S. hollow section. Balusters shall be 16x16 M.S. square bar and mid rail shall be 25x6 M.S. square bar.

10.2 Polished granite/ kota stone of 250mm wide of approved shades shall be provided for window sills, coping, etc.

10.3 Drip mould of size 20mm x 8mm shall be provided over cement plastering of chajjas, roof projections etc.

10.4 Grooves of uniform size 10x10mm shall be formed in plastered surface as per approved pattern.

10.5 The work tops in pantry / basin counters in toilets will be of granite.

10.6 Urinal partitions shall be of granite.

10.7 Providing and fixing 24 gauge Chicken Wire mesh in junction of block work & RCC works at corner/wall surface as per direction of Engineer-In-Charge.

10.8 Apron 0.90M wide of PCC M-10 grade and PCC peripheral Storm water drains around building (as per requirements).

10.9 One or more 1000 liters overhead tank "Sintex" or equivalent with necessary GI incoming and outgoing pipes and fittings along with 0.5 HP pump for pumping water shall be provided for supplying water in toilets / other areas.

10.10 Providing and installation plastic garbage bins(FRP/HDPE) of min 120l capacity of approved model of Sintex/Swift/Nutech/Sheetal or approved equ.make, design & spec as per standard/norms complete with all fitting,fixtures,lids,wheels etc.

10.11 Supplying and fixing min.18 mm thick smooth finish black granite inauguration stone of superior quality with overall size of 1000X750mm or 2000X1000(as per requirement of client/MECON), with ornamental edge moulded granite / marble / cement plaster band of approved shape. The prepared block shall be fixed with cement mortar 1:3 (1 Cement: 3 Coarse sand) in brick wall/block work with tiles/stone after chased, including finishing and painting all-round the stone and making aesthetically beautiful. The inauguration stone should contain engraved letters with chemically printing /stainless steel of approved matter in Hindi & English of required colour and size etc. and provision of curtain raising/sliding, light and landscaping/area development all around, complete as approved by IGGL/MECON.

11. SANITARY INSTALLATIONS

Standard type white/coloured glazed vitreous china sanitary fittings will be provided in toilets and kitchens of approved model and make. Standard chromium plated brass plumbing fittings and fixtures from approved manufacture will be provided in toilets and kitchens. Stainless steel sink shall be provided in kitchens/ pantries.

12. LANDSCAPING

Areas considered for plantation shall be road / pathway side planting of hedges and organized planting in vacant areas in front of buildings.

PARTICULAR JOB SPECIFICATION

STRUCTURAL STEEL WORKS

(Civil & Structural Section)

MECON LIMITED
(A Govt. of India Undertaking)

MECON Limited, 13th& 15th Floor,
North Tower, SCOPE MINAR,
Laxmi Nagar District Centre, Delhi-110092 (India)

SCOPE OF WORK FOR STRUCTURAL STEEL WORKS

1.0 This Specification shall apply to supply, fabrication and erection of steel structures in Terminal & laying works and general structural work.

The steel structures shall consist of but not limited to columns, column bracing, portals, monorail beams, platforms, crossovers, walkways, stairs, ladders, handrails, chequered Plate/Grating for platforms, MS Gate for Boundary wall, wicket gate, emergency gate, monorail beams, chequered Plate on cable trench, chain link fencing and fencing gate (if required), display sign boards for terminal etc.
This Specification covers the structural steel work mainly mentioned below. The structural work shall not be limited to the following description but shall be guided by technical / technological aspects for the total scope of work.

Brief description of major works under the item is as follows:

1.1 Supply, Fabrication and Erection of Mild Steel Gates for Boundary wall

Brief description of major items shall be as follows:

Supply, Fabrication and erection of mild steel gates-

a) 4.0m wide & 3.0 m high
b) 5.5m wide & 3.0 m high with wicket gate 1.2m wide
c) 1.2m wide & 3.0 m high (emergency gate)
d) 2.0m wide & 3.0 m high (as applicable)

Painting of MS Gate as per specification and drawing.

Gate shall be fabricated and erected as per detailed construction drawing to be issued to the successful tenderer.

1.2 Supply, Fabrication and Erection of Miscellaneous steel structural works.

Brief description of major items shall be as follows:

a) Supply, Fabrication and erection of columns, column bracing, portals, platforms, crossovers, walkways, stairs, ladders, handrails, chequered Plate/Grating for

platforms, chequered Plate on cable trench, display sign boards and any other structures required for completion of terminal works, etc. fabricated from rolled Steel section and built-up section conforming to IS:2062 and pipes conforming to IS:1161, as per requirement.

b) Painting of steel structure as per specification and drawing.

c) Sign board and other steel structure works shall be fabricated and erected as per detailed construction drawings to be issued to the successful tenderer.

1.3 Supply, Fabrication and Erection of Chain Link Fencing and Gate

Brief description of major items shall be as follows

a) Supply, fabrication and erection of 2.4 m high chain link with 600 mm at top barbed wire supported on steel posts with other accessories all work as per specification and drawing.

b) Painting of steel structure as per specification and drawing.

c) Gate of suitable width shall be provided in the direction of chain link fencing. The mesh and barbed wire used for the fabrication of gate shall be identical in all respects to that of chain link fencing, the door may be single leaf or double leaf depending on the width of the gate.

d) The gate frame shall be an angle frame with stiffeners at mid height and mid width. The mesh shall be welded to the gate frame/stiffeners, all work as per specification and drawings.

e) Painting of steel structure as per specification and drawing.

1.4 Supply, Fabrication and Erection of monorail beams (as applicable)

Brief description of major items shall be as follows

a) Supply, Fabrication and erection of monorail beams in store room buildings, including fittings and fixtures required for completion of works, etc. fabricated from rolled Steel section conforming to IS:2062.

b) Painting of structure as per specification and drawing.

c) Monorail beams and other steel structure works shall be fabricated and erected as per detailed construction drawings to be issued to the successful tenderer.

Note:

The cost & weight of MS bolts (permanent and service), washers, electrodes, putty, gases, cost of straightening the raw materials, cutting of flats from plates and providing splices, paints, tools, plants, electric power, water, other consumables, as required for the work shall be deemed to be included in the quoted rates.

All handling and transport charges of raw materials and fabricated structures including double handling, as required, for completion of work in accordance with time schedule, are deemed be included in the quoted rates.

Annexure-IV
to
Particular Job Specification
(INSTRUMENTATION WORKS)

SCOPE OF WORK

FOR

INSTRUMENTATION WORK

CONTENTS

1. INTRODUCTION
2. GENERAL
3. SCOPE OF WORK
4. FREE ISSUED ITEMS
5. INSPECTION CATEGORIZATION PLAN
6. LIST OF ATTACHMENTS

1. INTRODUCTION:

The Scope of Instrumentation work shall be Installation, field testing/ calibration & commissioning of the complete instrumentation and control system and supply of materials in accordance with the "SOR" and other technical documents attached with this Tender Specification.

2. GENERAL:

2.1.0 The Contractor shall be responsible for complete activities involving all subcontractors under him and also instrument sub-contractor (if applicable) works under him for the complete instrument works, as part of his scope.

2.1.1. Scope of work shall be read in conjunction with the SOR, drawings, specifications and other documents forming a part of the Contract document. Wherever there is a contradiction between the above, matter shall be referred to CLIENT / MECON and their decision in this regard shall be final and binding to contractor.

2.1.2. In the control room, the contractor's scope shall include laying, tagging and identification of all cables connected between the field and the control room, dressing of the same inside the control room. It is the responsibility of the contractor for proper routing, dressing of cables, terminations in panels inside the control room and also for loop checking.

2.1.3. Contractor shall quote unit rates for all items covered in the "SOR".

2.1.4. Contractor shall be responsible for co-ordination during installation, pre commissioning and commissioning with his Mechanical and other sub contractors for proper installation of line mounted instruments.

2.1.5. Contractor shall be responsible for installation, field testing, calibration, pre-commissioning and commissioning.

2.1.6. Contractor shall be responsible for coordination with the various instrumentation vendor for all kind of works inside the control room i.e. cable laying, tray erection, if any, and for proper cable terminations and loop checking.

2.1.7. Drawings and Installation Standards enclosed with the tender are only for reference and indicative of general nature for scope of work. Actual installation shall be carried out based on final installation standards, Bill of material and vendor's drawings / documents issued to site and as per instructions of Engineer-in-Charge.

2.1.8. Instrument items such as tubes, tube fitting, valves & manifold, junction boxes, cables, cable glands, plugs, adapters, pipe and pipe fittings etc., as required for installation & hook-ups of instrument listed under SOR shall be supplied from the attached list of Approved Vendor's only. Contractor shall take prior approval of make and specification of such items before placement of order.

2.1.9. Sealing of cable entries into the control room after laying and testing of all cables using MCT

Blocks.

2.1.10. During trial run/start up/commissioning at all the locations, the contractor shall provide skilled personnel and supervision round the clock at contractor's cost. Any defect or changes of setting, recalibration, etc., if any during the above activity shall be rectified/done immediately to the satisfaction of engineer-in-charge or his representative. The number and category of the personnel shall be as decided by the engineer-in-charge. The cost of the above is deemed to be included by the contractor in the rate quoted.

2.1.11. Contractor's scope shall include making holes in the RCC for fixing up of supports for instrumentation items, trays etc.

2.1.12. Contractor shall note that elbows (if required) shall be installed on the impulse line wherever required as per instructions of the Engineer-in-Charge even if it is not indicated in the installation standards.

2.1.14 The methodology of cable supports shall be as follows:-

a) Perforated/Angle/Ladder Trays (Contractor's supply) for all the cables from the individual instruments to the respective junction boxes.

b) Perforated/Angle/Ladder Trays (Contractor's supply) or Trenches (Prepared by contractor) as per the layout drawings (and any subsequent site adjustments as deemed necessary by the engineer-in-charge) from the junction boxes to the control room(s), the same supports/routes will have to be used for direct run cables from the individual instruments to the control room.

2.1.15 The field work shall be carried out under strict safety regulations and work permits as laid down by the client. The contractor shall take extreme care regarding safety and all safety gear like helmets; hand gloves, safety belts, spectacles etc. shall have to be provided by the contractor.

2.1.16 The single pvc sleeve type printed ferule shall be supplied. Ferruling for cables shall be done with tag no. of instruments for individual pair. Cross ferruling shall be done for cable ferruling in field and panels as per instruction of the Engineer in charge.

2.1.17 The contractor shall have to assess the actual site conditions/requirements before placement of order for cable/trays as per the actual site condition. Contractor has to prepare a cable routing layout as per actual site requirements from field to existing control room and get the approval before placement of procurement.

2.1.18 Allowable minimum bending radius of multipair / multicore cable shall be 6 times the outside diameter for unshielded cables and 8 times the outside diameter for shielded cables unless otherwise recommended by the supplier.

2.1.19 Location and flow direction of on-line instruments shall be checked by the contractor and to be rectified in case of any discrepancy as per the instruction of Engineer-In-Charge

2.1.20 The cable entry to the Control room shall be through MCT Blocks for all the control rooms, which shall be installed by the contractor. The installation of the pipe sleeves shall be as approved by the Engineer-in-charge. Contractor shall run all cables from field to Control Room. The cables shall run through Tray / Trench / IRC (instrument road crossings) from field to the control room as per Instrument Layout Drawings (to be furnished during execution).

2.1.21 Wherever trenches of longer/ smaller dimension than the maximum dimension identified in the SOR, the rate shall be considered as pro-rata basis for increase/ decrease in floor area change.

2.1.22 Welding/NDT, Charpy V-notch, QA/QC requirement etc. shall be as per Piping Material Specification (PMS), MECON standards & specifications and other requirement attached / mentioned elsewhere in the tender document. Contractor to also note that 100% MPI shall be carried out in the entire socket weld joints in the installation of instruments. The SOR price shall include all the above in the installation of respective instrument/item.

2.1.23 Welding shall be as per welding standard attached elsewhere in the tender document.

3. Scope of Work :

The instrumentation works shall include, but not limited to the following to complete the works (Scope of work is common for all the terminals of the complete pipeline and shall be read in conjunction with SOR, Std. drawings, Std. TS and other attachments of tender document.) :

a) Supply, Installation, testing, calibration & commissioning of all field instruments (as applicable) like Pressure Gauges, Temperature Gauges, Pressure Transmitters, Temperature Transmitters, RTD (skin type & Thermowell type), etc. as per P&ID, Technical Specifications, drawings & Datasheets attached with tender documents.

b) SS Tube Connection, Testing and Commissioning of Gas Over Oil Actuated Ball Valves (GOV) including the Supply and installation of SS tubes and fittings along with supports for impulse lines (wherever required), hydraulic testing, hydraulic oil (if required), painting of supports as per std, manifold/ isolation valves, sockolets etc as required for tubing of each Valve, as per the direction of Engineer-In Charge but exclusive of supply of Valves with actuator.

c) Testing & Commissioning of Metering Skids (alongwith Metering Panels, free issued cables, etc.) including all manpower, tools & tackles, equipments, consumables, etc. required as per direction of Engineer-in-charge. Scope also includes installation of metering panel & laying of free issued cables.

d) Testing , Commissioning , Electrical termination, calibration of Non-Intrusive Pig Signallers including all manpower, tools & tackles, equipments, consumables, etc. required as per direction of Engineer-in-charge.

e) Calibration of Pressure Safety Valves as detailed in SOR.

f) Design, Engineering, inspection, Supply, Installation, testing & commissioning of Fully wired Control cum TIC Panel/ Fully wired Control Panel (Free standing type, 2115 (mm) H (including 100 mm base + 15 mm anti-vibration pad) x 1200 (mm) W x 800 (mm) D) as per SOR alongwith all accessories like lamps, MCBs, TBs, etc. and Panel Mounted Instruments, including supply of commissioning spares with special tools and tackles as required, as per tender Document. All the signals of electrical, instrumentation, RTU/SCADA, CP, metering skid, etc. are to be interfaced through Control cum TIC Panel/ Fully wired Control Panel and necessary TBs alongwith accessories shall be provided for the same.

g) Design, Engineering, inspection, Supply, Installation, testing & commissioning of LEL Detection System comprising of LEL controller with Monitoring card (in Control Panel) (At DT, RT, IP stations) & LEL Detectors (in the field) (at each DT, SV, IP, RT station) as per tender document (inclusive of supply of yoke, supports, calibration kit, etc). At each SV station, LEL controller with Monitoring card is not required, only LEL detector (in the field) shall be provided and wired till the Control cum TIC Panel/ Fully wired Control Panel.

h) At each SV station, Supply and Installation of LEL Detector (in the field) and wiring up to the Control cum TIC Panel/ Fully wired Control Panel, including interfacing through the isolating barrier cum signal distributor, with further connectivity to the RTU/SCADA system

i) Supply, Installation, testing of instrument valves & manifolds, mounting accessories, impulse piping/ tubing, pipe/tube fittings, cable glands, identification tags, conduits, structural material required for instrument and junction box supports, trays and painting etc. as per P&ID, Technical Specifications , drawings & Datasheets attached with tender documents.

j) Supply, Laying, testing of earthing cables / strips for instrument cases & junction boxes to earth grid, GI / copper strips for grounding of racks/ cabinets/ panels in the control room with earth pit. Separate earthing to be provided for electrical & instrumentation system. Copper conductor to be considered for lightning arrestor. Earthing of transformer neutral shall have double earthing.

k) Supply, Installation , testing and commissioning of GI pipes for all the cables entering in control room of all the stations. Suitable sealing compound (such as filofoam) shall be provided for sealing of cable entries at both ends of each GI pipe after all the required cables have been laid through the pipeline. The sealing compound shall be heat resistant and water resistant. Plaster of Paris (POP) or any similar compound shall not be used.

l) Supply, Installation, testing and commissioning of Double compression type explosion proof cable glands in the field for all the instruments, pig signaler and Actuated Valves of all the

Terminals. Size of cable gland shall be as per site requirement. Cable gland shall be provided at each end of each cable laid by the bidder.

m) Supply, Installation, testing and commissioning of Double compression type Insulated cable glands in the control room building for all the instruments, pig signaler, Actuated Valves, electrical signals, Solar/ UPS signals etc of all the Terminals. Size of cable gland shall be as per site requirement. Cable gland shall be provided at each end of each cable laid by the bidder.

n) Excavation of trenches for burring the cables, filling with sand, laying of bricks, back filling and compacting of the excavated earth. Removal of pre-cast concrete slabs (If required) and sand on the existing concrete trench, and re-filling of RCC cable trenches with sand & re-fixing back the concrete slabs after laying of new cables.

o) Supply, Laying, testing of all interconnection cabling (single pair & multi pair signal, alarm, control and power cables and system cables etc.) between instrument items and junction boxes, instrument items/ junction boxes to Panel & between panels / cabinets / racks.

p) Dressing, Tagging, lugging, ferruling, glanding, pair/core identification and termination of all cables as per the cable schedule issued during detail engineering (single pair & multi pair signal, alarm, control, power and system cables etc.) in the instrument items, junction boxes, Control Panel & other panels / cabinets / racks.

q) Complete loop checking and megger testing of cables.

r) Supply, Installation, testing of junction boxes, cable glands, plugs and adapters.

s) Supply, Installation of canopies for instruments.

t) Supply, Fabrication, erection, laying & painting of cable trays, perforated/angle trays including clamping, identifying tags.

u) Calibration of all field instruments.

v) Hydraulic testing of instrument impulse lines (piping/tubing).

w) Commissioning.

x) Documentation.

y) As built drawings.

z) Supply & installation of yoke supports for instruments and junction boxes.

aa) Supply & installation of canopies fabricated out of 2 mm thick MS sheet/ FRP for instruments.

bb) Supply & installation of pipe sleeves for instrumentation cable entry to the control room.

cc) The quantities given in SOR against individual items are indicative and shall not be considered to be binding. The quantities may be increased, decreased or deleted at site at the

time of actual execution and as per discretion of owner/engineer-in-charge. The unit rate shall be operated to work out the final payment due to contractor. The procurement shall done as per actual site condition, Approved construction drgs. and Instruction of EIC.

dd) All the items required to complete the work shall be the scope of supply of contractor only.

ee) Supply means supply of instruments including all erection accessories as defined elsewhere in tender document.

ff) Contractor to note that wherever stainless steel is specified it refers to austenitic and / or ferrite steel.

gg) All cable glands shall be double compression type and shall be provided with PVC hood. Cable glands shall be suitable for the cable dimensions with ±2 mm tolerance.

hh) Suitable Cable glands shall be supplied by the bidder for both the ends of each cable laid by the bidder (including cable laid for bidder supplied items and cable laid for free issue items). All the cost of all the required cable gland shall be included in the quoted price of installation, testing and commissioning of respective cable.

ii) For all electrical items supplied by the contractor including junction boxes, cable glands and accessories supplied for projects in India, certification from CMRI for explosion proof to IS 2148 suitable for NEC Class -I, Div-1, Group C & D and Weatherproof to IP 55 as per IS 13947 and approval from CCOE (Chief Controller of Explosives, India) shall be furnished irrespective of place of manufacture.

jj) For instrument material supplied by Contractor such as cables, junction boxes, pipe, pipe-fittings, tube, tube-fittings, Instrument valves and Manifolds; drawings, data from vendor shall be furnished as required as per the respective standard specification. Also Contractor shall furnish:

i. Specification / Datasheet of Junction Boxes, Cable Glands, Plugs and adaptors.
ii. Complete catalogues with part list for all contractor supplied instruments.
iii. GA drawing of Junction boxes and canopies
iv. Certificates from statutory body for hazardous area for junction boxes, cable glands, plugs, adaptors.
v. Material test certificates.
vi. Vendor List for all items
vii. As-built Drawings / Documents. Earthing layout drawing to be submitted indicating instrument earthing, electrical earthing & lightening earthing. Lightning earthing shall be isolated from instrument earthing.
viii. Site Calibration report for all instruments.

Note: This list indicates the minimum drawings and document requirements. However, vendor shall submit a complete list of document and drawing schedule listing all the drawings and documents to be submitted by them during the course of execution of the job. The schedule shall list all drawings and documents along with their number and expected date of submission.

4. FREE ISSUED ITEMS:

The following instrument item shall be free issued to contractor:

a) Gas Actuated Valves AV / GOV, HOV

b) Metering Skids

c) Pig Signaller

5. INSPECTION CATEGORIZATION PLAN FOR INSTRUMENTATION ITEMS

Sl. No.	Item Description	Unit	Inspection Category TPIA	Inspection Category Contractor	Inspection Category PMC	Remarks
1	Instruments (PG, TG, PT, TT, LEL Detection System, RTD, etc)	Nos.	B	B/C	C	
2	Instrument cables	Nos.	B	B/C	C	
3	Control panel (including barriers/SDC/panel indicator,etc)	Nos.	B	B/C	B/C	
4	Cable Trays	Nos.	N/A	D	D	*
5	Junction Boxes , Cable Glands	Nos.	N/A	D	D	*
6	Tube Fittings , Tube manifolds, MCT Blocks, Earthing wires, Canopy	LS	N/A	D	D	*

Inspection Characterization Legend

1 A - Stage-wise Inspection + Final Inspection + Document Review as per QAP / specification / Drg.
2 B - Final Inspection + Document Review as per QAP / specification / Drg.
3 C - Document Review as per QAP / specification / Drg.
D - Document Review at site as per specification / Drg and material shall be accepted at site based on document review at site and based on approved
4 document.
TPI - Third Party Inspection Agency
QAP available in tender document shall be submitted by vendor / contractor (Duly filled & endorsed) for review/approval.

* Items shall be accepted at site based on the TC/IR review as per specification/Drg. Hence, IWC not required.

6. LIST OF ATTACHMENTS:

Refer the List of datasheets, Standard Specifications, vendor list and Standard Drawings enclosed elsewhere in the tender document.

LIST OF VENDORS FOR BOUGHT-OUT ITEMS

I) L.E. L DETECTION SYSTEM

1) Chemtrols Engineering Ltd.
2) Crowcon Detection Instruments Ltd
3) Detection Instruments (I) Pvt Ltd
4) Detector Electronics Corporation
5) Drager Safety AG & Co. KGAA
6) General Monitors Ireland Ltd
7) Mine Safety Appliances Company
8) MSA – Mines safety appliances.
9) Oldham France S.A.
10) Riken Keiki Co Ltd
11) Simrad Optronics Icare
12) Honeywell
13) Uniphos Envirotornic Pvt. Ltd.
14) ESP Safety

II) CONTROL AND SIGNAL CABLES

1) M/s Associated Cables
2) M/s Associated Flexibles
3) M/s Universal Cables Ltd
4) M/s Delton Cables Ltd
5) M/s BROOK
6) M/s KEI Industries Ltd
7) M/s CMI Limited
8) M/s Cords Cable Industries Ltd
9) M/s Elkay Telelinks (P) Ltd.
10) M/s Fine Core Cables Pvt Ltd
11) M/s Goyolene Fibres (I) Pvt Ltd
12) M/s Netco Cable Industries Pvt Ltd
13) M/s NICCO Corporation Ltd
14) M/s Paramount Communications Ltd
15) M/s Polycab Wires Pvt Ltd
16) M/s Radiant Cables Pvt Ltd
17) M/s Reliance Engineers Ltd.
18) M/s Suyog Electricals Ltd
19) M/s Thermo Cables Ltd
20) M/s Udey Pyrocables Pvt Ltd
21) M/s TC Communication
22) M/s RPG
23) M/s Gemscab

24) M/s Havell

III) ZENER BARRIERS/ISOLATORS

1) M/s MTL
2) M/s P & F
3) M/s Phoenix

IV) PRESSURE TRANSMITTERS & TEMPERATURE TRANSMITTERS

1. ABB India Ltd (Bangalore)
2. ABB Automation Products Gmbh
3. Emerson Process Management India Pvt Ltd
4. Emerson Proces Mgmt Asia Pacific Pte Ltd
5. Endress+Hauser Wetzer India Pvt Ltd
6. Endress+Hauser Wetzer Gmbh+Co. Kg
7. Endress+Hauser Gmbh+Co. Kg
8. Fuji Electric Systems Co. Ltd
9. Honeywell Automation India Ltd
10. Honeywell Inc.
11. Yokogawa India Limited
12. Yokogawa Electric Corporation

V)A SS TUBE

1) Sandvik, Sweden
2) Choksy Tube Co Ltd.
3) Heavy Metals & Tubes Ltd.
4) Ratnamani Metals & Tubes Ltd, Ahmedabad
5) Scorodite Stainless India Pvt Ltd, Mumbai

V)B SS TUBE FITTINGS

1) M/s Swagelok (USA)
2) M/s Parker (USA)
3) M/s Aura Inc, New Delhi
4) M/s Arya Crafts & Engineering Private Limited, Thane
5) M/s Comfit & Valves Pvt Limited, Mumbai

V)C SS VALVES & MANIFOLDS

1) M/s Swagelok (USA)
2) M/s Parker (USA)
3) M/s Aura Inc, New Delhi
4) M/s Arya Crafts & Engineering Private Limited, Thane
5) M/s Comfit & Valves Pvt Limited, Mumbai

VI) JUNCTION BOXES AND CABLES GLANDS

1) Baliga
2) CEAG Flameproof control gears
3) Ex-Protecta
4) Flameproof Equipments. (p) Ltd
5) Sterling Switch gears controls (p) Ltd
6) Shyam Switch Gear Pvt. Ltd
7) Flexpro Electricals
8) FCG
9) Heat Trace India Pvt. Ltd.
10) Sudhir Switchgears

VII) PUSH BUTTONS/LAMPS:

Push button :-
1) L&T
2) Siemens
3) English electric
4) Technic
5) ABB
6) GE
7) VAISHNO
8) CONCORD
9) SALZER
10) R Stahl
11) Control Switch Gear
12) Schinder-Electric

LAMPS :-
1) VAISHNO
2) CONCORD
3) SIEMENS
4) L&T
5) TT TEKNIC
6) SALZER
7) R Stahl
8) Control Switch Gear
9) Schinder-Electric

VIII) MCB'S:

1) HAVELL'S
2) INDO ASIAN
3) MDS
4) Datar Switchgear Pvt. Ltd.
5) Indiana Current Control Ltd.
6) Legrand (India) Pvt. Ltd.
7) Standard Electricals Ltd.

8) ABB Ltd
9) Novateur Electrical & Digital Systems
10) Siemens Limited
11) Schneider Electric India Pvt. Ltd.
12) M/s L&T

IX) RELAYS:

1) Omron
2) Tele Mechanique
3) Honeywell
4) Allan Bradly
5) Paramount
6) Denki
7) OEN
8) M/s Jyoti
9) WAGO PRIVATE LIMITED
10) PHOENIX CONTACT INDIA PVT. LTD

X) POWER SUPPLY UNIT:

1) Aplab
2) Phoenix Contact India Pvt. Ltd
3) Elnova
4) Siemens
5) Schneider
6) Pepperl & Fuchs
7) MTL
8) Cosel
9) WAGO PRIVATE LIMITED
10) M/s Meanwell
11) M/s Delta

XI) MCT BLOCKS :

1) MCT BRATTBERG
2) ROXTEC

XII) INDICATORS

Digital Indicator :-
1) Pyrotech Electronics
2) Lectrotek
3) Chino
4) Micro systems
5) Master Electronics
6) Masibus Instruments
7) Ranutrol
8) Honeywell

9) EUROTHERM
10) TOSHNIWAL INDUSTRIES PVT LTD

Bargraph Indicator / Totaliser :-
1) Chino
2) Masibus Instruments
3) Pyrotech Electronics
4) Lectrotek
5) Teletherm
6) Eurotherm
7) Yokogawa
8) Honeywell

XIII) CONTROL ROOM EQUIPMENT CONTROL PANEL & ACCESSORIES

1) M/s Keltron Controls Ltd., Kerala
2) M/s RITTAL
3) M/s Pyrotech
4) M/s Positronics Pvt. Ltd.

XIV) RTDs

1) General Instruments Ltd. Mumbai
2) Nagman Sensors Pvt. Ltd
3) Altop
4) Pyroelectric, Goa

XV) PRESSURE GAUGES

1) WIKA
2) Ashcroft (Precision Industries)
3) Forbes Marshall
4) Gauges Bourdon India Pvt. Ltd.
5) Thermal Instruments India Pvt. Ltd
6) Baumer
7) Tiwac (Walchandnagar)
8) Hirlekar
9) Manometer India
10) GEG
11) Switzer
12) Waree
13) AN Instruments Ltd. New Delhi
14) ITEC MEASURES PVT. LTD.

XVI) TEMPERATURE GAUGES

1) WIKA
2) Ashcroft (Precision Industries)
3) Gauges Bourdon India Pvt. Ltd.
4) Thermal Instruments India Pvt. Ltd.

5) Baumer
6) Tiwac (Walchandnagar)
7) Manometer India
8) GEG
9) M/s AN Instruments Ltd., New Delhi
10) ITEC MEASURES PVT. LTD.
11)General Instruments Ltd., Mumbai

Note-1

Bidder to offer all the items as per above list only **subject to submission of Certification and approvals and meeting the technical requirements**.

Note-2

For any other item(s) for which the vendor list is not provided, bidders has to offer those item(s) from reputed vendors/ suppliers who have earlier supplied same item(s) for the intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supply range. Also,

a) The vendor/ supplier should not be in the Holiday list of CLIENT.
b) Should have supplied at least 50% of required quantity or minimum 1 number whichever is higher of maximum size and rating of item(s) as required for intended services.

The successful bidder is required to enclose documentary evidences (PO copies alongwith relevant approved documents, Inspection Certificate, Type approval certificates, Vendor Registration Certificates, performance certificates, statutory certificates, undertaking for not in Holiday list, etc.) within 30 days from date of Placement of Order.

		SIGNAL CABLE (SINGLE PAIR)	
GENERAL	1	Description	Signal Cable
	2	Type	Twisted, Screened & Armoured
	3	Size	1P
	4	Make	As per suggested vendor list
CONDUCTOR	1	Material	Annealed Tinned Electrolytic Copper IS: 8130 /84
	2	Size	1.5 Sq.mm
	3	No. of Strands / Strand size mm	☑ 7/0.53 ☐ 7/0.43 ☐ 7/0.37 ☐ 7/0.30
	4	Shape of conductor	Stranded Circular
PRIMARY INSULATION	1	Material	☐ PVC (PVC Type.A - IS:5831'84) ☑ PVC (PVC Type.C -IS:5831'84) ☐ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☐ 0.5 ☐ 0.6 ☑ 0.8 ☐ 1.1mm(Suitable for 1100V as per IS 1554 Part-2)
	4	Colour Scheme	Black & Blue *(Note:2)*
	5	No. of twists (pair)	Min. 10 twist/meter
	6	Insulation Voltage Grade	1100V
INDIVIDUAL PAIR SHIELD	1	Material	Aluminium Mylar tape – black
	2	Type	Helical
	3	Thickness (nom.) in mm	☐ 0.05 ☑ 0.06 (Suitable for 1100V as per IS 1554 Part-I)
	4	Overlap	25%.
	5	Coverage	100%.
	6	Drain wire type / Size / No. of strands / Formation	Annealed tinned Copper / 0.5 mm^2 / (7 strands/0.3 mm) / in contact with the shield
OVERALL SHIELD	1	Material	~ NA ~
	2	Type	~ NA ~
	3	Thickness (nom.) in mm	~ NA ~
	4	Overlap	~ NA ~
	5	Coverage	~ NA ~
	6	Drain wire type / Size / No. of strands / Formation	~ NA ~
INNER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type. ST2 -IS:5831'84) ☑ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☑ 0.3 ☐ 1.0 ☐ 1.24 (Suitable for 1100V as per IS 1554 Part-I)
	4	Colour Scheme	Black *(Note:2)*

	5	Dia over sheath	*
ARMOUR	1	Material	☑ Single layer Gal. round steel wire ☐ Gal. flat steel strip confirming to IS:3975'79 & IS:1554-Part-I
	2	Size in mm	☑ 1.4 ☐ 4x0.8 (Suitable for 1100V as per IS 1554 Part-I)
	3	Dia over armour	*
OUTER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type.ST2 - IS:5831'84) ☑ FRLS PVC with AT and AR properties
	2	Type	☑ Extruded
	3	Thickness (nom.) in mm	☐ 0.8 ☐ 1.0 ☑ 1.24 (Suitable for 1100V as per IS 1554 Part-I)
	4	Overall diameter	*
	5	Tolerance on overall diameter	± 2%
	6	Colour Scheme	Light Blue *(Note:2)*
	7	Rip cord	Non-metallic under inner sheath
ELECTRICAL PARAMETERS	1	Conductor Resistance (max)	* at 20 Deg.C
	2	Drain wire resistance with shield	* at 20 Deg.C
	3	Insulation Resistance of cable	* at 20 Deg.C
	4	Mutual capacitance: core-core	* at 1 khz
	5	Mutual capacitance: core-screen	* at 1 khz
	6	Mutual inductance	*
	7	L/R ratio	*
	6	High Voltage Test	*
TEST & INSPECTION	1	General	According to IS:1554 (Part I) '88
	2	Insulation	IS:5831'84 except insulation resistance. Voltage/spark test BS:5308(Part-II)'86
	3	Armour	IS: 3975 '79
	4	Armour galvanisation	IS: 2633
FRLS PROPERTY	1	Oxygen index	Oxygen index of 29 at 27 (± 2) deg C According to ASTM D 2863
	2	Temp. index	According to ASTM D 2863
	3	HCL emission	According to IEC-754-1
	4	Smoke density	According to ASTM D 2843
	5	Flame retardant test	According to IEC-332-Part III cat. A
OTHERS	1	Drum length / No. of drums	*
	2	Total length	*
	3	Meter marking	*
	4	Possible variation in length	±5% for length < 5 km ±2% for length > 5 km

Notes:

1. '*' = Vendor to specify
2. Core identification shall be as per IS: 1554 (Part I)
3. A durable marking to be provided on the surface of the cable at regular intervals not exceeding 625mm. The marking shall include manufacturer's name, conductor material, size, pairs, insulation material etc. as per IS: 1554 (Part 1)

	SIGNAL CABLE (MULTI PAIR)		
GENERAL	1	Description	Signal Cable
	2	Type	Twisted, Screened & Armoured
	3	Size (pair)	2 / 4 / 6 / 8 / 10 / 12
	4	Make	As per suggested vendor list
CONDUCTOR	1	Material	Annealed Tinned Electrolytic Copper IS: 8130 '84
	2	Size	As per tender
	3	No. of Strands / Strand size mm	
	4	Shape of conductor	Stranded Circular
PRIMARY INSULATION	1	Material	☐ PVC (PVC Type.A - IS:5831'84) ☑ HRPVC (PVC Type.C -IS:5831'84) ☐ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☐ 0.5 ☐ 0.6 ☑ 0.8 ☐ 1.1mm (Suitable for 1100V as per BS:5308 Part-2)
	4	Colour Scheme	Black & Blue *(Note:2)*
	5	No. of twists (pair)	Min. 10 twists/meter
	6	Insulation Voltage Grade	1100 V
INDIVIDUAL PAIR SHIELD	1	Material	Aluminium Mylar tape – black
	2	Type	Helical
	3	Thickness (nom.) in mm	☐ 0.05 ☑0.06(Suitable for 1100V as per IS 1554 Part 1)
	4	Overlap	25%.
	5	Coverage	100%.
	6	Drain wire type / Size / No. of strands / Formation	Annealed tinned copper / 0.5 mm² / 7 strands / in contact with the shield
OVERALL SHIELD	1	Material	Aluminium Mylar tape – black
	2	Type	Helical
	3	Thickness (nom.) in mm	☐ 0.05 ☑0.06(Suitable for 1100V as per IS 1554 Part 1)
	4	Overlap	25%.
	5	Coverage	100%.
	6	Drain wire type / Size / No. of strands / Formation	Annealed tinned copper / 0.5 mm² / 7 strands / in contact with the shield
INNER SHEATH	1	Material	☐PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type. ST2 -IS:5831'84) ☑ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☑ 0.3 ☐ 1.0 ☐ 1.24(Suitable for 1100V as per IS 1554 Part 1)

	4	Colour Scheme	Black *(Note:2)*
	5	Dia over sheath	*
ARMOUR	1	Material	☐Single layer Gal. round steel wire ☐ Gal. flat steel strip confirming to IS:3975'79
	2	Size in mm	☐1.4 or ☐ 4x0.8 as per IS 1554
	3	Dia over armour	*
OUTER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type.ST2 - IS:5831'84) ☑ FRLS PVC with AT and AR properties
	2	Type	☑ Extruded
	3	Thickness (nom.) in mm	☐ 0.8 ☐ 1.0 ☑1.24(Suitable for 1100V as per IS 1554 Part 1) Thickness shall vary with no. of pairs as per IS 1554
	4	Overall diameter	*
	5	Tolerance on overall diameter	± 2%
	6	Colour Scheme	Light Blue *(Note:2)*
	7	Rip cord	Non-metallic under inner sheath
ELECTRICAL PARAMETERS	1	Conductor Resistance (max)	* at 20 Deg.C
	2	Drain wire resistance with shield	* at 20 Deg.C
	3	Insulation Resistance of cable	* at 20 Deg.C
	4	Mutual capacitance: core-core	* at 1 khz
	5	Mutual capacitance: core-screen	* at 1 khz
	6	Mutual inductance	*
	7	L/R ratio	*
	6	High Voltage Test	*
TEST & INSPECTION	1	General	According to IS:1554 (Part I) '88
	2	Insulation	IS:5831'84 except insulation resistance. Voltage/spark test BS:5308(Part-II)'86
	3	Armour	IS: 3975 '79
	4	Armour galvanisation	IS: 2633
FRLS PROPERTY	1	Oxygen index	Oxygen index of 29 at 27 (± 2) deg C According to ASTM D 2863
	2	Temp. index	According to ASTM D 2863
	3	HCL emission	According to IEC-754-1
	4	Smoke density	According to ASTM D 2843
	5	Flame retardent test	According to IEC-332-Part III cat. A
OTHERS	1	Drum length / No. of drums	*
	2	Total length	*
	3	Meter marking	*

	4	Possible variation in length	±5% for length < 5 km ±2% for length > 5 km

Notes:

1. '*' = Vendor to specify
2. Core identification shall be as per IS: 1554 (Part I)
3. A durable marking to be provided on the surface of the cable at regular intervals not exceeding 625mm. The marking shall include manufacturer's name, conductor material, size, pairs, insulation material etc. as per IS: 1554 (Part 1)

	CONTROL CABLE (THREE CORE) CABLE		
GENERAL	1	Description	Control Cable
	2	Type	PVC insulated, Armoured
	3	Size	3C
	4	Make	As per suggested vendor list
CONDUCTOR	1	Material	Annealed Tinned Electrolytic Copper IS: 8130 '84
	2	Size	As per tender
	3	No. of Strands	☑ 7
	4	Shape of conductor	Stranded Circular
PRIMARY INSULATION	1	Material	☐ PVC (PVC Type.A - IS:5831'84) ☑ HRPVC (PVC Type.C -IS:5831'84) ☐ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☐ 0.5 ☑ 0.8 ☐ 1.1mm (Suitable for 1100V as per BS:5308 Part-2)
	4	Colour Scheme	Black *(Note:2)*
	5	No. of twists (pair)	~ NA ~
	6	Insulation Voltage Grade	1100 V
INDIVIDUAL PAIR SHIELD	1	Material	~ NA ~
	2	Type	~ NA ~
	3	Thickness (nom.) in mm	~ NA ~
	4	Overlap	~ NA ~
	5	Coverage	~ NA ~
	6	Drain wire type / Size / No. of strands / Formation	~ NA ~
OVERALL SHIELD	1	Material	Aluminium Mylar tape – black
	2	Type	Helical
	3	Thickness (nom.) in mm	☐ 0.05 ☑0.06(Suitable for 1100V as per IS 1554 Part 1)
	4	Overlap	25%.
	5	Coverage	100%.
	6	Drain wire type / Size / No. of strands / Formation	Annealed tinned copper / 0.5 mm² / 7 strands / in contact with the shield
INNER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type. ST2 -IS:5831'84) ☑ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☑ 0.3 ☐ 1.0 ☐ 1.24 (Suitable for 1100V as per IS 1554 Part 1)
	4	Colour Scheme	Black *(Note:2)*
	5	Dia over sheath	*

ARMOUR	1	Material	☑ Single layer Gal. round steel wire ☐ Gal. flat steel strip confirming to IS:3975'79
	2	Size in mm	☑ 1.4 ☐ 4x0.8
	3	Dia over armour	*
OUTER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type.ST2 - IS:5831'84) ☑ FRLS PVC with AT and AR properties
	2	Type	☑ Extruded
	3	Thickness (nom.) in mm	☐ 0.8 ☐ 1.0 ☑ 1.24 (Suitable for 1100V as per IS 1554 Part 1)
	4	Overall diameter	*
	5	Tolerance on overall diameter	± 2%
	6	Colour Scheme	Black *(Note:2)*
	7	Rip cord	Non-metallic under inner sheath
ELECTRICAL PARAMETERS	1	Conductor Resistance (max)	* at 20 Deg.C
	2	Drain wire resistance with shield	* at 20 Deg.C
	3	Insulation Resistance of cable	* at 20 Deg.C
	4	Mutual capacitance: core-core	* at 1 khz
	5	Mutual capacitance: core-screen	* at 1 khz
	6	Mutual inductance	*
	7	L/R ratio	*
	6	High Voltage Test	*
TEST & INSPECTION	1	General	According to IS:1554 (Part I) '88
	2	Insulation	IS:5831'84 except insulation resistance. Voltage/spark test BS:5308(Part-II)'86
	3	Armour	IS: 3975 '79
	4	Armour galvanisation	IS: 2633
FRLS PROPERTY	1	Oxygen index	Oxygen index of 29 at 27 (± 2) deg C According to ASTM D 2863
	2	Temp. index	According to ASTM D 2863
	3	HCL emission	According to IEC-754-1
	4	Smoke density	According to ASTM D 2843
	5	Flame retardent test	According to IEC-332-Part III cat. A
OTHERS	1	Drum length / No. of drums	*
	2	Total length	*
	3	Meter marking	*
	4	Possible variation in length	±5% for length < 5 km ±2% for length > 5 km

Notes:

1. '*' = Vendor to specify
2. Core identification shall be as per IS:1554 (Part I)
3. A durable marking to be provided on the surface of the cable at regular intervals not exceeding 625mm. The marking shall include manufacturer's name, conductor material, size, pairs, insulation material etc. as per IS:1554 (Part 1)

		CONTROL CABLE (MULTI CORE)	
GENERAL	1	Description	Control Cable
	2	Type	PVC Insulated,Armoured
	3	Size (core)	4 / 12
	4	Make	As per suggested vendor list
CONDUCTOR	1	Material	Annealed Tinned Electrolytic Copper IS: 8130 '84
	2	Size	As per tender
	3	No. of Strands	☑ 7
	4	Shape of conductor	Stranded Circular
PRIMARY INSULATION	1	Material	☐ PVC (PVC Type A - IS:5831'84) ☑HRPVC (PVC Type C -IS:5831'84) ☐ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☐ 0.5 ☐0.6 ☑ 0.8 ☐ 1.1mm (Suitable for 1100V as per IS 1554 Part 1)
	4	Colour Scheme	Black *(Note:2)*
	5	No. of twists (pair)	~ NA ~
	6	Insulation Voltage Grade	1100 V
INDIVIDUAL PAIR SHIELD	1	Material	~ NA ~
	2	Type	~ NA ~
	3	Thickness (nom.) in mm	~ NA ~
	4	Overlap	~ NA ~
	5	Coverage	~ NA ~
	6	Drain wire type / Size / No. of strands / Formation	~ NA ~
OVERALL SHIELD	1	Material	~ NA ~
	2	Type	~ NA ~
	3	Thickness (nom.) in mm	~ NA
	4	Overlap	~ NA ~
	5	Coverage	~ NA ~
	6	Drain wire type / Size / No. of strands / Formation	~ NA ~
INNER	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type. ST2 -IS:5831'84) ☑ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☑ 0.3 ☐0.6 ☐ 0.8 (Suitable for 1100V as per IS 1554 Part 1)

	4	Colour Scheme	Black *(Note:2)*
	5	Dia over sheath	*
ARMOUR	1	Material	☐ Single layer Gal. round steel wire (for ≤10C) ☐ Gal. flat steel strip confirming to IS:3975'79 As per IS 1554
	2	Size in mm	☐ 1.4 ☐ 4x0.8 (As per IS 1554)
	3	Dia over armour	*
OUTER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type.ST2 - IS:5831'84) ☑ FRLS PVC with AT and AR properties
	2	Type	☑ Extruded
	3	Thickness (nom.) in mm	☐ 0.8 ☐ 1.0 ☑ 1.24 (Suitable for 1100V as per IS 1554 Part 1) thickness shall vary with no. of cores, as per IS 1554
	4	Overall diameter	*
	5	Tolerance on overall diameter	± 2%
	6	Colour Scheme	Black *(Note:2)*
	7	Rip cord	Non-metallic under inner sheath
ELECTRICAL PARAMETERS	1	Conductor Resistance (max)	* at 20 Deg.C
	2	Drain wire resistance with shield	* at 20 Deg.C
	3	Insulation Resistance of cable	* at 20 Deg.C
	4	Mutual capacitance: core-core	* at 1 khz
	5	Mutual capacitance: core-screen	* at 1 khz
	6	Mutual inductance	*
	7	L/R ratio	*
	6	High Voltage Test	*
TEST & INSPECTION	1	General	According to IS:1554 (Part I) '88
	2	Insulation	IS:5831'84 except insulation resistance. Voltage/spark test BS:5308(Part-II)'86
	3	Armour	IS: 3975 '79
	4	Armour galvanisation	IS: 2633
FRLS PROPERTY	1	Oxygen index	According to ASTM D 2863
	2	Temp. index	According to ASTM D 2863
	3	HCL emission	According to IEC-754-1
	4	Smoke density	According to ASTM D 2843
	5	Flame retardant test	According to IEC-332-Part III cat. A
OTH	1	Drum length / No. of drums	*
	2	Total length	*
	3	Meter marking	*

	4	Possible variation in length	±5% for length < 5 km ±2% for length > 5 km

Notes:

1. '*' = Vendor to specify
2. Core identification shall be as per IS:1554 (Part I)
3. A durable marking to be provided on the surface of the cable at regular intervals not exceeding 625mm. The marking shall include manufacturer's name, conductor material, size, pairs, insulation material etc. as per IS:1554 (Part 1).

	SIGNAL CABLE (SINGLE TRIAD)		
GENERAL	1	Description	Signal Cable
	2	Type	Twisted, Screened & Armoured
	3	Size	1T
	4	Make	As per suggested vendor list
CONDUCTOR	1	Material	Annealed Tinned Electrolytic Copper IS: 8130 /84
	2	Size	1.5 Sq.mm
	3	No. of Strands / Strand size mm	☑ 7/0.53 ☐ 7/0.43 ☐ 7/0.37 ☐ 7/0.30
	4	Shape of conductor	Stranded Circular
PRIMARY INSULATION	1	Material	☐ PVC (PVC Type.A - IS:5831'84) ☑ PVC (PVC Type.C -IS:5831'84) ☐ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☐ 0.5 ☐ 0.6 ☑ 0.8 ☐ 1.1mm(Suitable for 1100V as per IS 1554 Part-2)
	4	Colour Scheme	Brown, Black & Blue *(Note:2)*
	5	No. of twists (pair)	Min. 10 twist/meter
	6	Insulation Voltage Grade	1100V
INDIVIDUAL PAIR SHIELD	1	Material	Aluminium Mylar tape – black
	2	Type	Helical
	3	Thickness (nom.) in mm	☐ 0.05 ☑ 0.06 (Suitable for 1100V as per IS 1554 Part-I)
	4	Overlap	25%.
	5	Coverage	100%.
	6	Drain wire type / Size / No. of strands / Formation	Annealed tinned Copper / 0.5 mm^2 / (7 strands/0.3 mm) / in contact with the shield
OVERALL SHIELD	1	Material	~ NA ~
	2	Type	~ NA ~
	3	Thickness (nom.) in mm	~ NA ~
	4	Overlap	~ NA ~
	5	Coverage	~ NA ~
	6	Drain wire type / Size / No. of strands / Formation	~ NA ~
INNER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type. ST2 -IS:5831'84) ☑ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☑ 0.3 ☐ 1.0 ☐ 1.24 (Suitable for 1100V as per IS 1554 Part-I)
	4	Colour Scheme	Black *(Note:2)*

	5	Dia over sheath	*
ARMOUR	1	Material	☑ Single layer Gal. round steel wire ☐ Gal. flat steel strip confirming to IS:3975'79 & IS:1554-Part-I
	2	Size in mm	☑ 1.4 ☐ 4x0.8 (Suitable for 1100V as per IS 1554 Part-I)
	3	Dia over armour	*
OUTER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type.ST2 - IS:5831'84) ☑ FRLS PVC with AT and AR properties
	2	Type	☑ Extruded
	3	Thickness (nom.) in mm	☐ 0.8 ☐ 1.0 ☑ 1.24 (Suitable for 1100V as per IS 1554 Part-I)
	4	Overall diameter	*
	5	Tolerance on overall diameter	± 2%
	6	Colour Scheme	Light Blue *(Note:2)*
	7	Rip cord	Non-metallic under inner sheath
ELECTRICAL PARAMETERS	1	Conductor Resistance (max)	* at 20 Deg.C
	2	Drain wire resistance with shield	* at 20 Deg.C
	3	Insulation Resistance of cable	* at 20 Deg.C
	4	Mutual capacitance: core-core	* at 1 khz
	5	Mutual capacitance: core-screen	* at 1 khz
	6	Mutual inductance	*
	7	L/R ratio	*
	6	High Voltage Test	*
TEST & INSPECTION	1	General	According to IS:1554 (Part I) '88
	2	Insulation	IS:5831'84 except insulation resistance. Voltage/spark test BS:5308(Part-II)'86
	3	Armour	IS: 3975 '79
	4	Armour galvanisation	IS: 2633
FRLS PROPERTY	1	Oxygen index	Oxygen index of 29 at 27 (± 2) deg C According to ASTM D 2863
	2	Temp. index	According to ASTM D 2863
	3	HCL emission	According to IEC-754-1
	4	Smoke density	According to ASTM D 2843
	5	Flame retardant test	According to IEC-332-Part III cat. A
OTHERS	1	Drum length / No. of drums	*
	2	Total length	*
	3	Meter marking	*
	4	Possible variation in length	±5% for length < 5 km ±2% for length > 5 km

Notes:

1. '*' = Vendor to specify
2. Core identification shall be as per IS: 1554 (Part I)
3. A durable marking to be provided on the surface of the cable at regular intervals not exceeding 625mm. The marking shall include manufacturer's name, conductor material, size, pairs, insulation material etc. as per IS: 1554 (Part 1)

		SIGNAL CABLE (MULTI TRIAD)	
GENERAL	1	Description	Signal Cable
	2	Type	Twisted, Screened & Armoured
	3	Size (pair)	4 / 6 / 8
	4	Make	As per suggested vendor list
CONDUCTOR	1	Material	Annealed Tinned Electrolytic Copper IS: 8130 '84
	2	Size	As per tender
	3	No. of Strands / Strand size mm	
	4	Shape of conductor	Stranded Circular
PRIMARY INSULATION	1	Material	☐ PVC (PVC Type.A - IS:5831'84) ☑ HRPVC (PVC Type.C -IS:5831'84) ☐ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☐ 0.5 ☐ 0.6 ☑ 0.8 ☐ 1.1mm (Suitable for 1100V as per BS:5308 Part-2)
	4	Colour Scheme	Brown, Black & Blue *(Note:2)*
	5	No. of twists (pair)	Min. 10 twists/meter
	6	Insulation Voltage Grade	1100 V
INDIVIDUAL PAIR SHIELD	1	Material	Aluminium Mylar tape – black
	2	Type	Helical
	3	Thickness (nom.) in mm	☐ 0.05 ☑0.06(Suitable for 1100V as per IS 1554 Part 1)
	4	Overlap	25%.
	5	Coverage	100%.
	6	Drain wire type / Size / No. of strands / Formation	Annealed tinned copper / 0.5 mm² / 7 strands / in contact with the shield
OVERALL SHIELD	1	Material	Aluminium Mylar tape – black
	2	Type	Helical
	3	Thickness (nom.) in mm	☐ 0.05 ☑0.06(Suitable for 1100V as per IS 1554 Part 1)
	4	Overlap	25%.
	5	Coverage	100%.
	6	Drain wire type / Size / No. of strands / Formation	Annealed tinned copper / 0.5 mm² / 7 strands / in contact with the shield
INNER SHEATH	1	Material	☐PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type. ST2 -IS:5831'84) ☑ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☑ 0.3 ☐ 1.0 ☐ 1.24(Suitable for 1100V as per IS 1554 Part 1)

	4	Colour Scheme	Black *(Note:2)*
	5	Dia over sheath	*
ARMOUR	1	Material	☐Single layer Gal. round steel wire ☐ Gal. flat steel strip confirming to IS:3975'79
	2	Size in mm	☐1.4 or ☐ 4x0.8 as per IS 1554
	3	Dia over armour	*
OUTER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type.ST2 - IS:5831'84) ☑ FRLS PVC with AT and AR properties
	2	Type	☑ Extruded
	3	Thickness (nom.) in mm	☐ 0.8 ☐ 1.0 ☑1.24(Suitable for 1100V as per IS 1554 Part 1) Thickness shall vary with no. of pairs as per IS 1554
	4	Overall diameter	*
	5	Tolerance on overall diameter	± 2%
	6	Colour Scheme	Light Blue *(Note:2)*
	7	Rip cord	Non-metallic under inner sheath
ELECTRICAL PARAMETERS	1	Conductor Resistance (max)	* at 20 Deg.C
	2	Drain wire resistance with shield	* at 20 Deg.C
	3	Insulation Resistance of cable	* at 20 Deg.C
	4	Mutual capacitance: core-core	* at 1 khz
	5	Mutual capacitance: core-screen	* at 1 khz
	6	Mutual inductance	*
	7	L/R ratio	*
	6	High Voltage Test	*
TEST & INSPECTIO N	1	General	According to IS:1554 (Part I) '88
	2	Insulation	IS:5831'84 except insulation resistance. Voltage/spark test BS:5308(Part-II)'86
	3	Armour	IS: 3975 '79
	4	Armour galvanisation	IS: 2633
FRLS PROPERTY	1	Oxygen index	Oxygen index of 29 at 27 (± 2) deg C According to ASTM D 2863
	2	Temp. index	According to ASTM D 2863
	3	HCL emission	According to IEC-754-1
	4	Smoke density	According to ASTM D 2843
	5	Flame retardent test	According to IEC-332-Part III cat. A
OTH ERS	1	Drum length / No. of drums	*
	2	Total length	*
	3	Meter marking	*

	4	Possible variation in length	±5% for length < 5 km ±2% for length > 5 km

Notes:

1. '*' = Vendor to specify
2. Core identification shall be as per IS: 1554 (Part I)
3. A durable marking to be provided on the surface of the cable at regular intervals not exceeding 625mm. The marking shall include manufacturer's name, conductor material, size, pairs, insulation material etc. as per IS: 1554 (Part 1)

		POWER CABLE	
GENERAL	1	Description	Power Cable
	2	Type	Armoured
	3	Size	As per tender
	4	Make	As per suggested vendor list
CONDUCTOR	1	Material	Annealed Bare Electrolytic Copper IS: 8130 '84
	2	Size	As per tender
	3	No. of Strands / Strand size mm	☑ 7
	4	Shape of conductor	Stranded Circular
PRIMARY INSULATION	1	Material	☐ PVC (PVC Type.A - IS:5831'84) ☑ HRPVC (PVC Type.C -IS:5831'84) ☐FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☐ 0.5 ☑ 0.8 ☐ 0.8 ☐ 1.1mm
	4	Colour Scheme	Black *(Note:2)*
	5	No. of twists (pair)	~ NA ~
	6	Insulation Voltage Grade	1100 V
	7	Binder tape	Provided
INDIVIDUAL PAIR SHIELD	1	Material	~ NA ~
	2	Type	~ NA ~
	3	Thickness (nom.) in mm	~ NA ~
	4	Overlap	~ NA ~
	5	Coverage	~ NA ~
	6	Drain wire type / Size / No. of strands / Formation	~ NA ~
OVERALL SHIELD	1	Material	~ NA ~
	2	Type	~ NA ~
	3	Thickness (nom.) in mm	~ NA ~
	4	Overlap	~ NA ~
	5	Coverage	~ NA ~
	6	Drain wire type / Size / No. of strands / Formation	~ NA ~

INNER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type. ST2 -IS:5831'84) ☑ FRLS PVC
	2	Type	☑ Extruded ☐ Wrapped
	3	Thickness (nom.) in mm	☑ 0.3 ☐ 1.0 ☐ 1.24 (Suitable for 1100V as per IS 1554 Part 1)
	4	Colour Scheme	Black *(Note:2)*
	5	Dia over sheath	*
ARMOUR	1	Material	☑ Single layer Gal. round steel wire ☐ Gal. flat steel strip confirming to IS:3975'79 As per IS 1554
	2	Size in mm	☐ 1.4 ☐ 4x0.8 (As per IS 1554)
	3	Dia over armour	*
OUTER SHEATH	1	Material	☐ PVC (PVC Type.ST1 - IS:5831'84) ☐ HRPVC (PVC Type.ST2 - IS:5831'84) ☑ FRLS PVC with AT and AR properties
	2	Type	☑ Extruded
	3	Thickness (nom.) in mm	☐ 0.8 ☐ 1.0 ☑ 1.24 (Suitable for 1100V as per IS 1554 Part 1)
	4	Overall diameter	*
	5	Tolerance on overall diameter	± 2%
	6	Colour Scheme	Black *(Note:2)*
	7	Rip cord	Non-metallic under inner sheath
ELECTRICAL PARAMETERS	1	Conductor Resistance (max)	* at 20 Deg.C
	2	Drain wire resistance with shield	* at 20 Deg.C
	3	Insulation Resistance of cable	* at 20 Deg.C
	4	Mutual capacitance: core-core	* at 1 khz
	5	Mutual capacitance: core-screen	* at 1 khz
	6	Mutual inductance	*
	7	L/R ratio	*
	6	High Voltage Test	*
TEST & INSPECTION	1	General	According to IS:1554 (Part I) '88
	2	Insulation	IS:5831'84 except insulation resistance. Voltage/spark test BS:5308(Part-II)'86
	3	Armour	IS: 3975 '79
	4	Armour galvanisation	IS: 2633
FRLS	1	Oxygen index	According to ASTM D 2863
	2	Temp. index	According to ASTM D 2863
	3	HCL emission	According to IEC-754-1
	4	Smoke density	According to ASTM D 2843
	5	Flame retardent test	According to IEC-332-Part III cat. A
HE	1	Drum length / No. of drums	*

	2	Total length	*
	3	Meter marking	*
	4	Possible variation in length	±5% for length < 5 km ±2% for length > 5 km

PRESSURE GAUGES

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- °C **Level/Length**-mm

1	Type	Direct		Wetted parts material	---
2	Mounting	Local		Element	---
3	Dial size	150 mm		Lower body	---
	Colour	White (Non rusting plastic with black engraving)		Non wetted parts	---
4	Case material	SS 304		Process connection	---
5	Bezel ring	Screwed		Size	---
6	Window material	Shatter proof glass		Rating	---
7	Enclosure	IP 55 / NEMA 4		Facing &Finish	---
8	Pressure element	Bourdon tube		Capillary material	---
9	Element material	SS 316		Capillary length	---
10	Socket material	SS 316		Flushing & Filling	---
11	Accuracy	± 1% FSD	16	Over range protection	130% of range
12	Zero adjustment	Micrometer pointer (Internal)	17	Blow out protection	Required
			18	Options	
13	Connections	½" NPT (M)		a)	Snubber
	Conn. Location	Bottom		b)	Syphon
14	Movement	SS 304		c)	Gauge saver
15	Diaphragm seal	---		d)	Liquid filled casing
	Type	---		e)	2 valve, 3-Way Manifold
				f)	Dampener
			19	**Make & Model**	*

Tag No.	Range	Pressure		Design Temp.	Fluid	Location	Options
		Operating	Design				
PG -**	*	**	**	**	NATURAL GAS	**	e
PG -**	0 - 1	**	**	**	NATURAL GAS	**	c, e

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor.
2) '**' As per P& ID
3) Make of the PG shall be from approved vendor list of Mecon /Client.
4) Quantities shall be as per SOR.

PRESSURE TRANSMITTERS

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2(G) **Temperature**-°C **Level/Length**-mm

GENERAL			MEASURING UNIT		
1	Function	Transmit & Indicate	24	Service	Pressure
2	Type	Electronic Smart μP Based	25	Element	Diaphragm
3	Case	Mfg. Std.	26	Body Material	Carbon Steel
4	Mounting	Yoke / Direct	27	Element Material	SS 316L
5	Enclosure Material	Epoxy Coated Die-cast Aluminium	28	Process Connections	½" NPT(F)
	Enclosure class	IP 65		Process Conn. Locn.	Bottom
6	Elec. Area Class.	Zone-I, Gr.IIA & IIB, T6	29	Diaphragm Seal:-	Not Required
7	Intrinsically safe & Flameproof	Required		Type	---
8	Air supply	N.A		Wetted Parts Matl.	---
9	Power supply	24 VDC		Other Material	---
10	Cable entry	½" NPT(F)		Process Conn.:-	
11	Accuracy	± 0.075% of SPAN		Size and Rating	---
12	Repeatability	± 0.1%		Facing and Finish	---
TRANSMITTER			MISCALLANEOUS		
13	Output	4 – 20 mA DC, Two wire, with HART		Over Range Protection	130% of Range
14	Trans. Power supply	0 - 2 4 V DC		Local Indicator	Integral LCD Display
CONTROLLER				Burn out direction	High(Field Configurable)
15	Output	---		Zero Span Adjustment	Required
16	A/M switch	---		Electrical Connection	1/2" NPT(F)
	No. of positions	---	30	Material Certification	As per EN 10204 3.1
17	Set Point Adj.	---	31	**Options**	
18	Manual Regulator	---	a)	Output Meter	W.P. Intr Safe (note 4)
19	Mode	---	b)	Mounting Accessories	Mounting accessories for 2" Pipe Mounting – Material / Direct Mounting
RECORDER			c)	2- Valve Manifold	Required
20	Chart	---	d)	Zero elevn. & suppression	Required
21	Chart Drive	---			
22	Moving Parts Matl.	---	32	**Make & Model**	*
23	Chart speed	---			

Tag No.	Range	Operating Pressure	Design Press.	Design Temp.	Fluid State	Fluid	Location	Options
**	**	**	**	**	**	**	**	a, b, c, d

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor.
2) '**' As per P& ID
3) Over range protection shall be 130% of maximum static pressure.
4) Local Digital Output meter should indicate the line pressure in Kg/cm2g.
5) Environmental cover to be provided for each transmitter
6) Transmitter shall have zero elevation /suppression for the service specified.
7) Make of the PT shall be from approved vendor list of Mecon /Client.
8) Drain Connection shall be provided for each PT
9) PESO Certification for the desired Hazardous Area Application shall be provided for each PT. PESO Certificate Number shall be mentioned on each PT.
10) 316SS tag plates stamped with Tag No. in 6 mm characters shall be permanently attached using 316SS screws or wire for each PT
11) Manuals like zero adjustment manual, etc shall be provided
12) Cripple Mode Detection is required (as per NAMUR NE 43) for each PT.

TEMPERATURE GAUGE

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- °C **Level/Length**-mm

GENERAL			FILLED SYSTEM		
1	Type	FILLED SYSTEM	15	SAMA Class	V B
2	Well	REQUIRED		Compensation	CASE
3	Mounting	LOCAL	16	Bulb type	ADJUSTABLE UNION
4	Dial size	150 mm		Bulb material	316SS
5	Colour	WHITE (Non rusting plastic with black figs.)	17	Bulb union threaded to	½" NPT(M)
6	Case material	DIE CAST ALUMINIUM (EPOXY PAINTED)	18	Extension type	RIGID
7	Window material	SHATTER PROOF GLASS	19	Bulb dia	8 mm (Min)
8	Conn. Location	BOTTOM	20	Capillary material	
9	Accuracy	±1% FSD		Armour Flexible	
10	Enclosure	WEATHER PROOF TO IS2147		Armour material	
	Enclosure class	IP 55 / NEMA 4		Capillary length	
11	Zero adj. Screw	MICROMETER POINTER (Internal)	21	Overrange protection	130% OF RANGE
BIMETAL			THERMOWELL		
12	Stem:		22	Material	SS 316
	Type		23	Construction	DRILLED BAR STOCK
	Material		24	Process connection	1 ½" FLANGED
	Size		25	Gauge connection	½" NPT (F)
13	Stem diameter		26	Thermowell as per drg	Drg enclosed
14			27	Options a)	LIQUID FILLED
			28	**Make & Model**	*

Tag No.	Range	Temperature (°C)		Well Dimensions		Flange		Location	Remarks
		Operating	Design	U	T	Material	Rating/Face/ Finish		
TG – ***	*	***	***	*	*	ASTM A 105	600 # / 300# / 150 # RF 125 AARH	***	

Note:

1. '*' Information to be supplied by the Vendor / Contractor.
2. Vender shall furnish Make & Model No. with product catalogues along with the offer.
3. Make of the TG shall be from approved vendor list of Mecon /Client.
4. For installation of Temperature Gauge & Thermowell, vendor shall follow the MECON's installation standards enclosed with tender.
5. ' *** 'shall be as per P & ID

0	**DATASHEET OF TEMPERATURE GAUGES**	**MECON LTD. DELHI**
Rev.		**DS No: MEC/ 05/E5/DS-TG**

TEMPERATURE TRANSMITTERS

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2(G) **Temperature**-°C **Level/Length**-mm

GENERAL			MEASURING UNIT		
1	Function	Transmit & Indicate	14	Input	From RTD
2	Type	Electronic Smart µP Based	15	Linearization	Upscale
3	Case	Mfg. Std.	16	RFI/ EMI protection	Required
4	Mounting	Yoke	17	Load Driving Capability	6000 Ohms
5	Enclosure Material	Epoxy Coated Die-cast Aluminium	18	Cripple Mode Detection	Required (as per NAMUR NE 43)
	Enclosure class	IP 65	MISCALLANEOUS		
6	Elec. Area Class.	Zone-I, Gr.IIA & IIB, T6	19	Local Indicator	Integral LCD Display
7	Intrinsically safe & Flameproof	Required	20	Electrical Connection	1/2" NPT(F)
8	Air supply	N.A	21	Material Certification	As per EN 10204 3.1
9	Power supply	24 VDC	22	Burn out direction	High(Field Configurable)
10	Cable entry	½" NPT(F)	23	Material Certification	As per EN 10204 3.1
11	Accuracy	± 0.05 % of FSD	24	Zero Adjustment	Required
			25	Electrical Connection	1/2" NPT(F)
TRANSMITTER			26	Mounting Accessories	Mounting accessories for 2" Pipe Mounting
12	Output	4 – 20 mA DC, Two wire, with HART	27	**Make & Model**	*
13	Trans. Power supply	0 - 2 4 V DC			

Tag No.	Range	Operating Pressure	Design Press.	Design Temp.	Fluid State	Fluid	Location	Remarks
**	**	**	**	**	**	**	**	

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor.
2) '**' As per P& ID
3) Local Digital Output meter should indicate the line pressure in Degree Celcius
4) Environmental cover to be provided for each transmitter
5) Transmitter shall have zero elevation /suppression for the service specified.
6) Make of the TT shall be from approved vendor list of Mecon /Client.
7) PESO Certification for the desired Hazardous Area Application shall be provided for each TT. PESO Certificate Number shall be mentioned on each TT.
8) 316SS tag plates stamped with Tag No. in 6 mm characters shall be permanently attached using 316SS screws or wire for each TT
9) Manuals like zero adjustment manual, etc shall be provided

RESISTANCE TEMPERATURE DETECTOR (SKIN TYPE)

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- °C **Level/Length**-mm

GENERAL			13	Cable entry	½" NPT (F)
1	Assembly as per drg.	Drg. enclosed	14	No. of entries	Single
			15	Enclosure type	Weather proof to IP55
ELEMENT			THERMOWELL		
3	No. of elements	Simplex	16	Material	--
4	Calibration	As per DIN 43760	17	Construction	--
5	Element material	Platinum (Pt 100)	18	Process connection	--
6	Resistance at 0°C	100 ohms	19	Inst. connection	--
7	Leads	Standard	20	Thermowell as per drg	--
8	Sheath				
	O.D.	6 mm		TRANSMITTER	
	Material	SS 316	21	Quantity	-
9	Nipple & Union Material	SS 316	22	Input	-
10	No. Of wires	4 Wire	23	Output	--
HEAD			24	Power Supply	--
11	Head Cover type	Screwed cap & SS chain	25	Mounting	--
12	Material	Cast Aluminium	26	Enclosure class	--
			27	**Make & Model No.**	*

Tag No.	Range	Temperature		Well Dimensions		Flange		Service	Remarks
		Nor	Design	U	T	Material	Rating/Face/ Finish		
TE-**	*	**	**	--	--	--	--	**	

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor
2) '**' As per P& ID
3) RTD offered shall be of highest accuracy – TYPE – A
4) Make of the RTD shall be from approved vendor list of Mecon /Client.
5) One No. Spare for each range to be considered.
6) Installation Pad to be provided with the RTD.

RESISTANCE TEMPERATURE DETECTOR

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- °C **Level/Length**-mm

GENERAL			13	Cable entry	½" NPT (F)
1	Assembly as per drg.	Drg. enclosed	14	No. of entries	Single
			15	Enclosure type	Dual Chamber Weather proof to IP55
ELEMENT			THERMOWELL		
3	No. of elements	Simplex	16	Material	SS 316
4	Calibration	As per DIN 43760	17	Construction	Drilled bar stock
5	Element material	Platinum (Pt 100)	18	Process connection	1 ½" Flanged
6	Resistance at 0°C	100 ohms	19	Inst. connection	½" NPT (F)
7	Leads	Standard	20	Thermowell as per drg	Drg. Enclosed
8	Sheath				
	O.D.	8 mm		TRANSMITTER	
	Material	SS 316	21	Quantity	-----
9	Nipple & Union Material	SS 316	22	Input	-----
10	No. Of wires	4 Wire	23	Output	-----
HEAD			24	Power Supply	-----
11	Head Cover type	Screwed cap & SS chain	25	Mounting	-----
12	Material	Cast Aluminium	26	Enclosure class	-----
			27	**Make & Model No.**	*

Tag No.	Range	Temperature		Well Dimensions		Flange		Service	Option
		Nor.	Design	U	T	Material	Rating/Face/ Finish		
TE - ***	*	***	***	*	*	ASTM A 105	600# RF 125 AARH	Natural Gas	

NOTES

1) '*' Information to be supplied by the Vendor / Contractor.
2) Make of the RTD shall be from approved vendor list of Mecon /Client.
3) RTD offered shall be of highest accuracy – TYPE – A.
4) ' *** 'shall be as per P & ID

0	**DATASHEET OF RESISTANCE TEMPERATURE DETECTOR**	**MECON LTD. DELHI**
Rev.		**DS No: MEC/05/E5/DS-RTD**

SPECIFICATIONS
FOR
LEL DETECTION SYSTEM

SERVICE	:	To detect the presence of Hydrocarbon in the various locations in Terminal area.
NO. OF DETECTORS / COMPOSITION	:	Refer Data Sheet enclosed for quantity requirements.
ALARMS	:	To be available in the respective Control Rooms.
RELAY CONTACT FOR EACH CHANNEL	:	Required
RELAY CONTACT FOR GROUPING	:	Required

DATA SHEET

1) SENSOR:

TYPE	:	Poison resistant, infrared absorption type for combustible gas or vapours. (Non-selective)
CONSTRUCTION	:	Explosion proof, SS 316 body with stainless steel flame arrestors, dust cover, weather proof as per NEMA 4X or IP 65 **(NOTE-1).** Sensor element shall be replaceable type / plug in type. Terminal box shall be provided for further cabling. Flying leads shall not be offered. Cable entry shall be ¾" NPT (F) **(NOTE-2).**
ELECTRICAL AREA CLASSIFICATION	:	Zone –1, Gr. II A & II B, T3, CCOE
RANGE	:	0 –100 % LEL
ACCURACY	:	± 3 % of gas reading @ ≤50% LEL, ± 5 % of gas reading @ > 50% to 100% LEL
MOUNTING ACCESSORIES	:	Vendor to indicate.

NOTE 1: Splash guard & weatherproof cap for protection against dust and rain shall be provided.

NOTE 2: The junction box shall be weatherproof to IP 55 and certified to Explosion proof.

2) GAS MONITOR / CONTROLLER:

TYPE	:	Solid state electronic, panel mounted plug in modular construction
NO. OF CHANNELS:		No of Channels shall be as per attached sheet with this specification. However, single loop integrity shall be maintained by one monitoring card per sensor. Single Channel Monitors shall be offered.
POWER SUPPLY	:	24 V DC Monitor / Controller shall supply power to sensor.
RANGE AND METER CALIBRATION	:	Adjustable between 0-100 % LEL
INDICATORS	:	Required 0 –100 % LEL.
INDICATOR LIGHTS: (Separate for each channel)		Power on by a confidence flash for every 2 seconds. 20 % LEL 40 % LEL Malfunction (malfunction shall include short cut. line breaking, over range and earth fault.)
OTHER FEATURES	:	a) Dual adjustable set points for gas level alarm.

b) SPDT latching type relay contacts shall be provided for following:

i) 20 % LEL (each channel)
-alarm high (adjustable)

ii) 40 % LEL (each channel)
-alarm very high (adjustable)

iii) Malfunction (common)

iv) High (Common)

v) High High (Common)

c) Relay contacts shall be suitably rated for the specified power requirements.

d) Reset push button (common)

e) Sensor calibration without alarm outputs shall be achieved by inhibit switch on relevant channel.

MOUNTING	:	Monitors / Controllers shall be supplied mounted in 19" racks with screwed terminals at the back. However 19" racks shall be fully wired-up in ready to use condition. Dummy plates shall be provided on spare channel slots wherever required (20 % spare slot shall be provided wherever applicable).
CALIBRATION	:	Set of fully equipped calibration gas kit consisting of at least a cylinder / bottle of calibration gas for minimum 6 months use (of known mixture of air and gas) , a pressure regulator with gauge , flexible tube / hose , adapter cap (to fit sensing head) shall be supplied to enable online calibration of LEL detectors.

NOTE:

1. **The Bidder shall indicate distance limitation if any between Sensor and Monitor.**
2. **RS-485 port shall be provided for provision of interfacing with RTU/SCADA.**

LEL SYSTEM

1) FLAMMABLE GAS DETECTORS.
2) EXPLOSION PROOF JUNCTION BOXES.
3) WEATHERPROOF CAP.

QUANTITY (Sensors/detectors)	**:**	**As per Price Schedule**
MONITORS / CONTROLLERS	**:**	**1 Set**
NO OF CHANNELS	**:**	**16 NOS. (With Common Indicating Meter)**
MONITORING CARDS	**:**	**As per Price Schedule**
CALIBRATION KIT	**:**	**1 Set**

SPECIAL INSTRUCTIONS TO VENDOR FOR LEL DETECTION SYSTEM

1) Vendor to note that the offered instruments shall be suitable for the following ambient conditions :

Temperature Range	:	45°C (Max.)
Humidity	:	99% (Max.)
Rainfall	:	1000mm (Max.)

2) Power Supply shall be from the respective control panel to each monitor rack at each terminal, Power distribution is in the Vendor's scope. If conversion to DC level is required, the system shall be based on dual redundant power packs.

3) Vendor shall furnish the statutory certificates of explosion proof for both LEL detector and the junction boxes.

4) Vendor to note that the pellister of the detector must be poison resistant to the normally known pollutants present in a hydrocarbon processing industry including sulphides, SO_2, chlorides, dust etc.

5) Mounting details of the LEL detectors shall be furnished.

6) Adjustable set points shall be provided at the monitors.

7) Calibration gas suitable for the calibration of LEL detectors shall be included.

8) Mute circuits with acknowledge and reset buttons shall be provided.

9) Detailed configuration diagram showing connection of monitor etc. along with detailed catalogues, manuals etc. shall be furnished.

10) Time period required between successive calibrations of the LEL detectors shall be furnished.

11) Commissioning Spares for all the items shall be included. The vendor shall furnish the detailed list of the commissioning spares

INSTRUMENTATION SECTION

TECHNICAL SPECIFICATION

FOR

CONTROL PANEL & ACCESSORIES

TS. No. : MEC/05/E5/TS /CP - 030

MECON LIMITED

DELHI - 110 092

0	20.01.10				
Revision	**Date**	**Description**	**Prepared by**	**Checked by**	**Approved by**

SPECIFICATIONS
FOR
CONTROL PANEL & ACCESSORIES

GENERAL

Site of Installation

1.	Plant and Location	:	As per P & ID
2.	Client	:	As per P & ID
3.	Consultant	:	MECON LIMITED.
4.	Location of control panel	:	Control Room and accessories.
5.	Floor	:	Concrete (By client)
6.	Air Conditioning	:	Yes (By client)
7.	Control Panels Quantity	:	As per SOR

Scope of Work :

a) Supply of Control Panel (free standing, cubicle type) along with all accessories like Power Supply Distribution Box (PDB), Lamps, MCBs, Relays, Barriers / Isolators, Selector Switch, Signal Multipliers (SDC), etc. as per this Technical specification.

b) Client will provide 230 VAC, 50 Hz. at control room for Control panel and utilities respectively. Further distribution and necessary surge protection device shall be part of panel vendor.

c) Separate Terminal Blocks shall be provided for RTU signals with 20% spare terminals. All the signals shall be available at RTU TBs.

d) Quantities of control panel accessories (Push Buttons, Lamps, Relays, Zener Barriers, and SDC Cards etc.) shall be as per the Technical Requirements during drawing approval/detail engineering.

e) Mounting heights :

i) Miniature and subminiature instruments (3 rows)	Bottom row	1100mm
	Middle row	1350mm
	Top row	1600mm
ii) Electric push buttons 700mm	--	

INST CONTROL PANEL CONSTRUCTION

1.	Type	:	Self-supported, Free Standing, enclosed cubicle and Non-graphic.
2.	Lighting	:	Required for inside panel with door switch.
3.	Ventilation	:	Required with louvers backed by wire fly screen & fan. Fan Failure alarm required
4.	Doors	:	CRCA doors in the Rear of the Panel with locking arrangement with Handle and Key.
5.	Door width	:	Each max. of 600mm and shall suit width of the panel. Panel width is indicative only. The sizes shall be sufficient to accommodate the required hardware specified in MR. However the depth and height shall be 800 & 2200 respectively.
6.	Cable Entry	:	Bottom, Cable Glands shall be double compression type for external armoured cables. All unused entries shall be plugged.
7.	Receptacles	:	Required for 230VAC (UPS).
8.	Painting	:	The finish shall include sand blasting, grinding, chemical cleaning, surface finishing by suitable filter and two coats of high grade lacquer with wet sanding between coats.. Two coats of paint in panel colour shall be given for Non-glossy high stain finish. Panel face final colour shall be of the following: a) Siemens Grey (RAL 7032) b) Panel internal shall have a finish color of pale cream – IS 352 c) Channel Base shall have a finish color of black
9.	Channel Base	:	100X50X6 MM, MS material
10.	Name Plates	:	Front of Panel Instrument name plates shall be black laminated plastic with white core. Nameplate shall be provided on the rear of the panel also.

11 Dimensions & Material of Construction

a)	Panel dimension	:	2115 (mm) H (including 100 mm base + 15 mm anti-vibration pad) x 1200 (mm) W x 800 (mm) D (Finalized during detail engineering).
b)	Control Panel	:	Front 3 mm thick CRCA steel/5.0 mm thick HRCA steel, Welded to frame
c)	Side & Top plates	:	2 mm thick CRCA steel, Welded to frame
d)	Door panel	:	CRCA doors in the rear of the Panel
e)	Cable gland plate	:	3 mm thick CRCA steel
f)	Anchor Bolt Size	:	By vendor
g)	Lifting Eye Bolt	:	Required
h)	Anti Vibration Pad	:	Required (15mm thick rubber pad).

Note :

***Panel shall be electrically isolated from base frame.**

12 WIRING

a) Type : General purpose, Intrinsically safe

b) Wiring details

110 VAC UPS Wiring

External to Cabinet	:	Min. 3x2.5 mm²/copper conductor PVC insulated armoured
Inside the cabinet	:	Min. 19 Strands, 16 AWG copper conductor PVC insulated
230 VAC Wiring (Non UPS)	:	3x2.5mm² copper conductor PVC insulated armoured
Low Voltage internal	:	Min. 19 Strands, 16 AWG copper conductor PVC insulated to cabinet

c) Signal Wiring

External to Cabinet	:	1.0 mm² twin twisted individual shielded overall shielded with overall drain PVC insulated armoured
Inside the cabinet	:	Multi stranded min. 1.0 mm² copper conductor PVC insulated twin twisted and shielded.

d)	**Terminal type**	:	Screw clamp type with Pressure Plate
	Terminal size for signal	:	Suitable for min. 2.5 mm² size conductor
	Terminal size for power dist.	:	Suitable for min. 4.0 mm² size conductor and higher as per actual cable sizes.
	Terminal block	:	Clip-on type

e) **Wiring colour code**

Power Supply	:	Hot – Red, Neutral - Black, Earth – Green
DC Wiring	:	Positive – Red, Negative – Black
Alarm System	:	White
Control & shutdown	:	Yellow
Analog signals (IS)	:	Light blue
Identification of Cable Termination	:	Criss – Crossing PVC tube ferruling.

f) **Power Indication Lamps** : 230VAC UPS – Red color, 230VAC NUPS – Red Color
24VDC – Green Color

Note: Dedicated terminal for SCADA has to be Provided

A) POWER SUPPLY DISTRIBUTION BOXES FOR PANELS

1.	Function	: Distribute power to Individual instruments
2.	Mounting	: Mounted at the panel inside
3.	Door	: Front single door
4.	Painting	: As per panel painting specifications.
5.	**Dimensions and material construction**	
Box dimension		: By vendor.
5.2	Box plate thickness	: 3mm hot rolled steel.
6.	Cable entry	: By vendor
7.	Accessories	: 600V Grade DPST MCB for power Distribution and SP MCB for barriers & Suitable MCB for Control panel Instruments
8.	Special requirements	: MCBs for incoming feeder.

B) BULK POWER SUPPLY UNIT

1.	Input	: 230 V AC, 50 Hz.
2.	Output	: 24 V
3.	Rating	: By Vendor
4.	Quantity	: Dual Redundant as per requirement

SPECIFICATIONS FOR ACCESSORIES

1. MCB

Make	: HAVELL'S/ INDO ASIAN/ MDS.
Qty.	: As required + 20% spare

2. Lamps

Type	: LED Clustered Type
Voltage	: 24 VDC
Make / Model No.	: SIEMENS / L & T
Quantity	: As required + 20% spare

3 Relays

Type	: Plug in relays
Contact Type	: Potential free contact
Contact No.	: 3 NO. + 3 NC
Rating	: 24V DC, 5.0 A
Make / Model No.	: OEN/ OMRON.
Quantity	: As required + 20% spare

4. Space Heater

Rating	: 60W, 230 V AC with Thermostat.
Make	: KEC

5 Power Supply Unit:

Make / Model No.	: ELNOVA/ APLAB

SPECIFICATION FOR SIGNAL DISTRIBUTION CARDS

SL.NO.	DESCRIPTION	DETAILS
1.	TYPE	DUAL OUTPUT CURRENT ISOLATOR
2.	INPUT	4-20 mA D.C
3.	OUTPUT	TWO NOS. 4-20 mA ISOLATED OUTPUTS AS MINIMUM
4.	ISOLATION	BETWEEN INPUT & OUTPUT, BETWEEN INPUT & OUTPUT WITH POWER SUPPLY, BETWEEN OUTPUT & OUTPUT
5.	ACCURACY	± 0.1%
6.	POWER SUPPLY	24 V D.C
7.	TRANSMITTER POWER SUPPLY	24 V D.C
8.	OUTPUT LOAD DRIVING CAPACITY	600 Ohms MINIMUM FOR EACH OUTPUT
9.	MOUNTING	DIN RAIL (BACK OF THE PANEL)
10.	MAKE	**MTL / P&F**
11.	MODEL NO	*

NOTES:-

* - BY VENDOR

SPECIFICATION FOR ISOLATING BARRIERS

SL.NO.	DESCRIPTION	DETAILS
1.	TYPE	SHUNT DIODE SAFETY BARRIER
2.	APPLICATION INSTRUMENT TYPE & QUANTITY	(i) 4-20 mA Analog I/P from 2 wire transmitter– As required + 20% Spare (ii) 4-20 mA Analog O/P to I/P Converter – As required +20% Spare
3.	HAZARDOUS AREA CLASSIFICATION	ZONE-I, GR. I, IIA & IIB, T3
4.	APPROVAL AUTHORITY	FM/BASEEFA/CSA/SA/CMRS
5.	SUPPLY VOLTAGE	24 V DC
6.	FUSE RATING	*
7.	END TO END RESISTANCE	*
8.	POLARITY	*
9.	MOUNTING	DIN RAIL (BACK OF THE PANEL)
10.	OPERATING TEMP	0 TO 60° C
11.	OPEN CIRCUIT VOLTAGE	*
12.	SHORT CIRCUIT CURRENT	*
14.	MAKE	**MTL/P&F**
15.	MODEL NO	*

NOTES:- * --By Vendor

SPECIFICATION FOR ISOLATING BARRIERS

SL.NO.	DESCRIPTION	DETAILS
1.	TYPE	SHUNT DIODE SAFETY BARRIER
2.	APPLICATION INSTRUMENT TYPE & QUANTITY	4-20 mA Analog I/P from Temperature Transmitter
3.	HAZARDOUS AREA CLASSIFICATION	ZONE-I, GR. I, IIA & IIB, T3
4.	APPROVAL AUTHORITY	FM/BASEEFA/CSA/SA/CMRS
5.	SUPPLY VOLTAGE	24VdC
6.	FUSE RATING	*
7.	END TO END RESISTANCE	*
8.	POLARITY	*
9.	MOUNTING	DIN RAIL (BACK OF THE PANEL)
10.	OPERATING TEMP	0 TO 65° C
11.	OPEN CIRCUIT VOLTAGE	*
12.	SHORT CIRCUIT CURRENT	*
13.	MAKE	**MTL/P&F**
14.	MODEL NO	*

NOTES:- * --By Vendor

SPECIFICATION FOR ISOLATING BARRIERS

SL.NO.	DESCRIPTION	DETAILS
1.	TYPE	SHUNT DIODE SAFETY BARRIER
2.	APPLICATION INSTRUMENT TYPE & QUANTITY	Limit switches (SPDT snap action Micro type) - As required + 20% Spare
3.	HAZARDOUS AREA CLASSIFICATION	ZONE-I, GR. I, IIA & IIB, T3
4.	APPROVAL AUTHORITY	FM/BASEEFA/CSA/SA/CMRS
5.	SUPPLY VOLTAGE	24 V DC
6.	FUSE RATING	*
7.	END TO END RESISTANCE	*
8.	POLARITY	*
9.	MOUNTING	DIN RAIL (BACK OF THE PANEL)
10.	OPERATING TEMP	0 TO 60° C
11.	OPEN CIRCUIT VOLTAGE	*
12.	SHORT CIRCUIT CURRENT	*
14.	MAKE	**MTL/P&F**
15.	MODEL NO	*

NOTES:- * --By Vendor

Project :-*
Client :-*
Contractor :- *
FOA No.:-*

QAP OF CONTROL CUM TIC PANEL/ CONTROL PANEL

SL.No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE & CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT / ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
					M	C&E				M	C	E	
1	2	3	4	5	6		7	8	D*	**9			10
(A)	**MATERIAL**												
1	CRCA SHEET	A) MATERIAL	MAJOR	CHEMICAL, PHYSICAL, COMPOSITION	100%	SAMPLE	IS-513 APP.DRG.	M.T.C./Q.A.REP.		V	V	R	
		B) THICKNESS	MAJOR	MEASUREMENT	100%	SAMPLE	APP.DRG.	M.T.C./Q.A.REP.		P	V	R	
2	GASKCT	A) DIMENSION	MAJOR	MEASUREMENT	100%	SAMPLE	APP.DRG.	M.T.C./Q.A.REP.		P	V	R	
		B) HARDNESS	MAJOR	MEASUREMENT	100%	SAMPLE	IS 111149	M.T.C./Q.A.REP.		V	R	R	
3	TERMINALS	A) TYPE,SIZE & MAKE	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		V	V	R	
4	POWER SUPPLY UNIT/ DIGITAL PROCESS INDICATOR/ MCB / SIGNAL MULTIPLIER/INDICATION LAMP/ PUSH BUTTON/POWER SOCKET/ RELAY/ FAN HEATER/ PANEL INDICATOR/ TEMP. DECTECTION	A) TYPE, SIZE & MAKE, RATING	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		V	V	R	
		B) FUNCTIONAL	MAJOR	MEASUREMENT	100%	SAMPLE	APP.DRG.	Q.A.REPORT		V	V	R	
5	PAINT/POWDER	A) SHADE	MAJOR	VISUAL	100%	SAMPLE	APP.DRG./IS-5,	M.T.C./Q.A.REP.		V	V	R	
		B) FINISH	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	M.T.C./Q.A.REP.		V	V	R	

DOC.NO. REV…….CAT…….

LEGEND : * RECORDS,INDENTIFIED WITH "TICK" (O) SHALL BE ESSENTICALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** M: MANUFACTURER/SUB-SUPPLIER; C:TPI E: END CLIENT / MECON
P: PERFORM W: WITHNESS AND V: VERIFICATION R: REVIEW
NOTE: THE REPRESTENTATIVE OF PROJECT OWNER MAY ALSO BE ASSOCIATED FOR INSPECTION

MANUFACTURER/ SUB SUPPLER	MAIN SUPPLIER	FOR CLIENT USE	REVIEWED BY	APPROVED BY	APPROVED SEAL
SIGNATURE					

Project :-*
Client :-*
Contractor :- *
FOA No.:-*

QAP OF CONTROL CUM TIC PANEL/ CONTROL PANEL

SL.No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE & CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT / ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
					M	C&E				M	C	E	
1	2	3	4	5	6		7	8	D*	**9			10
(B)	**FABRICATION**												
1	FABRICATION/CUBICLE AND COMPONENTS	A) DIMENSION	CRITICAL	MEASUREMENT	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		B) CUTOUT DIMENSION	CRITICAL	MEASUREMENT	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		C) MOUNTING FACILITY	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		D) CABLE GL.PLATE	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		E) GASKET ARGMNT	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		F) DEBURRING	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
2	PRETREATMENT [7 TANK PROCESS]	A) DEGREASING	CRITICAL	VISUAL	100%	SAMPLE	IS-6005	Q.A.REPORT		P	V	R	
		B) DERUSTING	CRITICAL	VISUAL	100%	SAMPLE	IS-6005	Q.A.REPORT		P	V	R	
		C) PHOSPHATISING	CRITICAL	MEASUREMENT	100%	SAMPLE	IS-6005	Q.A.REPORT		P	V	R	
		D) PASSIVATION	CRITICAL	VISUAL	100%	SAMPLE	IS-6005	Q.A.REPORT		P	V	R	
3	SURFACE PREPARATION & PAINTING	A) PRIMER	CRITICAL	VISUAL	100%	SAMPLE	APP.SPEC.	Q.A.REPORT		P	V	R	
		B) SURFACER	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG./F.S.	Q.A.REPORT		P	V	R	
		C) FINAL PAINTING	CRITICAL	VISUAL	100%	SAMPLE	APP.SPEC.	Q.A.REPORT		P	V	R	
		D) THICKNESS	CRITICAL	MEASUREMENT	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
4	ASSEMBLY	A) WIRE SIZE	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		V	V	R	
		B) MOUNTING AS PER APP.DRG.	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		C) TERMINATION/WIRING	MAJOR	MEASUREMENT	100%	SAMPLE	APP.DRG.	Q.A.REPORT		V	V	R	
		D) GASKETTING	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		E) EARTHING	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		F) CHECK ARRANGEMENT/LAYOUT OF COMPONENTS & ARRANGEMENTS	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		G) WIRE SIZE/ COLORE CODE/ FRRULING	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		H) NAME PLATE & LABLES	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	

DOC.NO. REV.....CAT.....

LEGEND : * RECORDS,INDENTIFIED WITH "TICK" (O) SHALL BE ESSENTICALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.
** M: MANUFACTURER/SUB-SUPPLIER; C:TPI E: END CLIENT / MECON P: PERFORM W: WITHNESS AND V: VERIFICATION R: REVIEW
NOTE: THE REPRESTENTATIVE OF PROJECT OWNER MAY ALSO BE ASSOCIATED FOR INSPECTION

MANUFACTURER/ SUB SUPPLER	MAIN SUPPLIER	FOR CLIENT USE	REVIEWED BY	APPROVED BY	APPROVED SEAL
SIGNATURE					

Project :-*
Client :-*
Contractor :- *
FOA No.:-*

QAP OF CONTROL CUM TIC PANEL/ CONTROL PANEL

SL.No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE & CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT / ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
					M	C&E				M	C	E	
1	2	3	4	5	6		7	8	D*	**9			10
		1) VERIFICATION OF COMPONENTS/ RATINGS/ ARRANGEMENTS/ LOCATION FOR EASY ACCESSABILITY AND MAINTENANCE	CRITICAL	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
		1) DOOR ALINGEMENT	MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	V	R	
C)	**FINAL INSPECTION & TESTING**												
1	OVERALL DIMENSIONAL & VISUAL CHECK		MAJOR	MEASUREMENT	100%	10%	AP.DRG.	Q.A.REPORT		P	W	W/R	
2	CONTINUITY & FUNCTIONAL TEST AND INTERLOCK		MAJOR	FUNCTIONAL	100%	10%	APP.DRG.	Q.A.REPORT		P	W	W/R	
3	IR TEST (BEFORE & AFTER HV)		MAJOR	MEASUREMENT	100%	10%	F.S.	Q.A.REPORT		P	W	W/R	
4	HV TEST		MAJOR	MEASUREMENT	100%	10%	F.S.	Q.A.REPORT		P	W	W/R	
5	VERIFICATION OF BILL OF MATERIAL FOR MAKE , QTY., RATINGS , MAKE , MODEL NO.		MAJOR	VERIFICATION	100%	100%	APP.DRG.	Q.A.REPORT		P	W	W/R	
6	PAINT SHADE & THICKNESS		CRITICAL	MEASUREMENT	100%	10%	APP.DRG.	Q.A.REPORT		P	W	W/R	
7	GENERAL APPEARANCE (STRAIGHTNESS, FREE FROM SCRATCHES,BENDS,DENTS AND SHEET THICKNESS)		MAJOR	VISUAL	100%	SAMPLE	APP.DRG.	Q.A.REPORT		P	W	W/R	
8	OVERALL FINISH ALONG WITH ALINGNMENT		MAJOR	VISUAL	100%	SAMPLE	APP.DRG./F.S	Q.A.REPORT		P	W	R	
9	IP TEST		MAJOR	VERIFICATION	IP TEST VERIFIED BY PAPER INSERTION TEST					P	V	R	
10	AS BUILT DRAWINGS									P	R	R	

DOC.NO. REV…….CAT…….

LEGEND : * RECORDS,INDENTIFIED WITH "TICK" (O) SHALL BE ESSENTICALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER; C:TPI E: END CLIENT / MECON P: PERFORM W: WITHNESS AND V: VERIFICATION R: REVIEW
NOTE: THE REPRESTENTATIVE OF PROJECT OWNER MAY ALSO BE ASSOCIATED FOR INSPECTION

MANUFACTURER/ SUB SUPPLER	MAIN SUPPLIER	FOR CLIENT USE	REVIEWED BY	APPROVED BY	APPROVED SEAL
SIGNATURE					

Annexure-V
to
Particular Job Specification
(TELECOMMUNICATION WORKS)

TELECOM WORKS FOR PIPELINE LAYING

PREPARED & ISSUED BY

MECON LIMITED
(A Govt. of India Undertaking)
DELHI - 110092

0	23.06.2026	Ayan	Ratnadeep	Pankaj Shrivastava
Rev.	Date	By	Checked	Approved

SCOPE OF WORK FOR TELECOM

1.0 EXECUTION METHODOLOGY

24 fibers armored Optical fiber cable shall be laid in self-lubricated in 40mm HDPE Telecom Duct / Conduit along with the pipeline to facilitate proper operational & management control of the pipeline and dedicated Telecommunication system. The entire work related to HDPE Duct Supply, HDPE duct laying (for supplied HDPE Duct as well as Free issued HDPE Duct), testing and commissioning , OFC Supply, OFC laying (for supplied OFC as well as free issued OFC), Termination, testing and commissioning and other works related to OFC and HDPE Duct will be in the scope of the Bidder. The optical fibre cable shall be as per MECON Technical specification MEC/TS/05/E5/T/096.

The following definitions shall apply:

a) PURCHASER/ OWNER: IGGL

b) CONSULTANT/ PMC : MECON Limited

c) VENDOR/ BIDDER/ TENDERER/ CONTRACTOR : Individual or organization entering into agreement with Purchaser to perform services or work and/ or to supply materials specified in Purchase Document.

d) PURCHASE DOCUMENT: All the written materials, in addition to the Specifications, Data sheets and Drawings which describe the contract terms and conditions, delivery requirements and instructions and any other information/ instructions required by the vendor to perform the specified services and/ or to supply the specified materials.

2.0 SCOPE OF WORK :-

2.1 Telecommunication work : -

The scope of work related to telecommunication work shall include (but not limited to) all the necessary work for supply of pre-lubricated HDPE duct, laying of pre-lubricated HDPE duct (supplied HDPE Duct as well as free-issued HDPE Duct) along with new pipeline in same pipeline trench, supply of all required HDPE Duct accessories for laying of HDPE Duct, OFC supply, OFC laying (supplied OFC as well as free-issued OFC) by blowing technique in HDPE Duct and Termination of OFC at all terminal stations as per the scope of pipeline laying plan in same pipeline trench and in separate trench inside the terminals (as applicable) including supply of OFC, Blowing of OFC (supplied OFC as well as free-issued OFC) in Duct, Supply of OFC accessories like Joint Closure, Electronic marker, Electronic marker locator, OFC marker, Erection of OFC accessories, supply and erection of Blowing Pit/Jointing Pit, Erection of wiremesh Testing of HDPE duct, Installation of wire mesh below FTC, Loop of 15 Mtrs OFC in wire mesh etc including all the items required for installation of FTC, Termination of OFC on FTC with Zero Db connector (including supply) and all work as required(including Civil work) for complete termination of OFC on FTC, splicing with street fiber, Jointing of OFC as per channeling plan, test of the fiber for the smooth operation system on wavelength, preparation of reports, Testing of OFC, commissioning, Quality assurance and Control, Documentation and any other job, including any minor civil work, complete in all respect as per direction of Engineer In-charge required for completion and hooking up of OFC based telecom system. The GPS location and the chainage of all the Blowing and Jointing pits shall be indicated in the OFC blowing report as well as Blowing/ Jointing Pit installation report. The GPS location and the chainage of all the HDPE duct couplers shall be indicated in the HDPE duct installation report as well as HDPE duct coupler installation report.

The channelling plan of the OFC for OFC termination on FTC shall be provided to the successful bidder during detail engineering. The termination and testing of the OFC at each station shall be done as per the channelling plan.

Jointing pit shall be provided at all planned and unplanned joint locations of OFC. For each run of OFC, OFC Joint Pit, Joint closures and Joint Markers shall be provided for all locations of OFC joint (both planned and unplanned) and at all locations of OFC joint, OFC joint pit, joint closures, joint markers have to be installed as per the specification or as per direction of Engineer- In charge. Electronic markers shall be provided at each OFC pit (both Blowing pit and Joint pit) (both planned and unplanned) of each run of OFC and at all locations of each OFC Pit (Blowing pit, Joint pit). Electronic markers have to be installed as per the specification or as per direction of Engineer- In charge.

3.0 Detail Scope of Work :

A. HDPE Telecom Duct Supply and Laying:

1. Supply and Laying of 40 mm outer diameter pre lubricated HDPE Telecom Ducts & accessories, making records of test report of material, estimation of quantity, including Storage, Transportation, and unloading at site, submission of HDPE alignment sheets, planning and schedule preparation for HDPE laying. Each run of HDPE Duct shall be laid minimum 200 mm away from the Outer wall of the pipeline.

2. All the HDPE accessories including Plastic Couplers (PC), End Plugs (EP), Cable Sealing Plugs (CSP), End Caps (EC) shall be provided as per the requirement at site sufficient and complete for the complete HDPE duct (supplied HDPE Duct as well as free-issued HDPE Duct. Any number of any of the HDPE Duct accessories required at site during execution, testing and commissioning of complete HDPE duct and complete OFC shall be provided and is included in scope of the bidder. In addition to the it, following quantity of HDPE Duct accessories shall be provided as spare and handed over to IGGL –

    - Plastic Couplers (PC)- 20 nos,
    - End Plug - 20 nos
    - Cable Sealing Plug -20 nos,
    - End Cap-20 nos

3. Erection, testing commissioning of complete HDPE Duct and making the work complete in all respect as per specification and as per following -

    a) Each run of solid Permanently Lubricated HDPE Duct shall be laid as per specification along entire underground pipeline in the same trench (and in separate trench inside the terminal area) including cased crossing for installation of OFC.

    b) For CS pipe casing crossings (except HDD across river), 2 runs of CS conduit shall be laid for each such crossing (except for HDD across river) and two ducts as per the schematics have to be laid in each cased crossing as directed by Engineer-in-charge in all type of soils and terrain. Only 1 duct shall be used for OFC blowing for each cased crossing and 2nd duct shall be kept as spare.

c) For CS pipe casing crossings for HDD across river, 2 runs of CS conduit shall be laid for each such crossing and two ducts as per the schematics have to be laid in each cased crossing as directed by Engineer-in-charge in all type of soils and terrain. OFC shall be laid in both the ducts. 1 no. pit shall be provided for each run of the OFC at each end of the OFC.

d) Inside each station premises, both the runs of HDPE duct (laid along with pipeline) should be laid inside each station and taken to the telecom/ control room of respective station.

e) At all the junction location / branching location; blowing/ jointing pit (as per the decision of EIC) has to be considered irrespective of distance and HDPE duct has to be laid / terminated as per the requirement of site.

f) Joint of HDPE conduit, scaling of conduit, HDPE conduit testing after laying as defined in specification, sealing of HDPE conduit, cased crossing, separate trench & conduit near the terminals, joints locations marking, padding, back filling, sealing of conduit, providing cable markers, joint markers, Warning mat (as procured for Pipeline under mechanical works) etc. as per the MECON specification. All the accessories must be suitable of 6-8 Kg/cm2 (min.) pressure rating. Testing, commissioning and handing over of system, drawings & documentation as per contract. The GPS location and the chainage of all the HDPE duct couplers shall be indicated in the HDPE duct installation report as well as HDPE duct coupler installation report

4. Supply and erection of OFC cable pit (RCC pit as per dwg) at every 1 KM distance (tentative) for Blowing Pit and every 04 km(tentative) for JP(Jointing Pit), additionally Joint Pit has to be provided at each joint location (either planned or unplanned), Blowing pit has to be provided at every KM and inside every station, at 200mm (min) away from the main pipeline (the outer wall of Pit shall be min 200mm away from the outer wall of the pipe). The blowing pit and Jointing pit as per the above philosophy shall be provided for each run of OFC laid along with the pipeline.

5. For river crossing through HDD crossing, additional blowing/ jointing pit at both end of the river bank shall be provided for each run of OFC; The blowing pit / jointing pit have to be provided as per the site requirements / at all junction – branching locations.

6. The GPS location and the chainage of each Blowing and Jointing pits shall be indicated in the OFC blowing report as well as Blowing/ Jointing Pit installation report. Also, the GPS location and the chainage of each Blowing and Jointing pits shall be updated in the as-built OFC cable alignment sheet. The OFC cable pit shall be provided (as per the requirement as mentioned above) separately for each run of OFC

B. <u>OFC Supply and Laying / Blowing:</u>

1. Supply of armoured 24 fiber composite Optical fiber cable (18F G.652D, 6F G.655) of 4000 Meter and ± 2.5 % cable drums as per the specification provided in the tender. Shorter length drum shall be strictly treated as per the clause no . 4.3 (e) of OFC TS No. MEC/TS/05/E5/T/096. Any additional necessary requirements (for shorter length supply - such as Jointing closure, pit, marker etc) due to shorter length as per TS /Scope of work are in vendor scope.

2. All the works for laying, splicing (jointing), termination, testing and commissioning of free-issued OFC is also included in scope of the bidder.

3. **Submission of Complete OFC alignment sheets based on the pipeline alignment sheet,** planning and COMPLETE OFC laying schedule preparation, COMPLETE OFC testing before and after laying, Laying of armored COMPLETE OFC by blowing technique, Jointing of COMPLETE OFC by jointing closures, all cable sealing, padding backfilling etc. using all material including supply and laying of warning mats etc., termination of cables at FTC with all accessories, cable jointing, commissioning and making the work

complete in all respect as per specification, drawings & documentation as per contracts & other relevant work specified by Engineer-in-charge.

4. Inside each station premises, Complete OFC (laid along with pipeline) should be laid inside the HDPE Duct and taken to the telecom/ control room of respective station and terminated on the FTC.

5. All activities pertaining to Blowing / Laying of optical fiber cable in same pipeline trench inside 40 mm COMPLETE HDPE telecom duct (after testing of COMPLETE OFC drum at site), through CS/ COMPLETE HDPE conduits at crossing, in separate trench inside COMPLETE HDPE Duct in terminal area, testing of COMPLETE OFC before and after Blowing/laying, cable sealing etc. using all materials required complete as per specifications and drawing provided in the bid document is included in scope of the bidder and shall be done as per direction of EIC. For each run of COMPLETE OFC, Spare loop of 10 Meter in Blowing Pit at each KM, 20 Meter at Jointing Pit (from each end, total 40 mtrs) & 15 Meter at each station on wire-mesh (as applicable) shall be provided.

6. Inside each station, bidder's scope shall include excavation of trench inside the station (from the location of installation of blowing pit to the control/ telecom room). The depth of trench shall be minimum 800 mm and width shall be minimum 100 mm. COMPLETE HDPE Duct shall be laid in the trench and COMPLETE OFC shall be laid inside the COMPLETE HDPE Duct. Minimum 50 mm padding of sand and class A bricks shall be laid below the COMPLETE HDPE duct. After laying of COMPLETE HDPE Duct, Class A bricks shall be laid over the COMPLETE HDPE duct and further 50mm padding of sand shall be done over the bricks. After padding of sand, backfilling of trench shall be done. Cable route markers shall be provided over the trench at every 15 meters interval and at each side of road crossing and each turning point of trench.

7. The COMPLETE HDPE duct shall be laid till the FTC in control room.

8. The GPS location and the chainage of all the Blowing and Jointing pits shall be indicated in the OFC blowing report as well as Blowing/ Jointing Pit installation report and also updated in as-built alignment sheet.

9. Supply & installation of set of FTC (approved Make) with zero dB connectors & wire mesh (structural size 1.5 Mtr. x 1 Mtr. and mesh size 15 cm x 15 cm) and other accessories for termination of 24 fibre OFC in the control room (at all control room locations) (tentative). 48F FTC shall be supplied at all the stations.

10. Termination of OFC cables at FTC with all accessories per channeling plan, cable jointing, commissioning and making the work complete in all respect as per specification, drawings & documentation as per contract & other relevant work specified by Engineer-in-charge. The channeling plan will be provided to successful bidder during detailed engineering. At RT station, FTC shall be installed inside existing control room building and OFC shall be terminated in it.

11. Supply, Installation, testing and commissioning of "JOINTING CLOSURE" as per standard specification.

12. Testing and commissioning of the complete OFC as per specification, testing before and after laying, identification of fault, rectification of fault, all cable sealing, padding, backfilling etc. using all material including termination of cables at FTC with all accessories, cable jointing, commissioning and making the work complete in all respect as per specification, Drawings & documentation as per contracts & other relevant work specified by Engineer-in-charge. COMPLETE OFC testing shall be done as per the specifications provided in the tender. If any fault is observed in before testing or during testing, the same has to be rectified without any cost implication to IGGL/ MECON. Also, if the test results are not within acceptable limits, the same has to be rectified without any cost implication to IGGL/ MECON and COMPLETE OFC shall be re-tested without any cost implication to IGGL/ MECON until the test results are

obtained within acceptable limits. The COMPLETE OFC shall be handed over to other contractor (as communicated by IGGL/ MECON) only after successful completion and commissioning of all the works of Telecom. Final COMPLETE OFC testing shall be done in the presence of the contractor of Telecommunication system. All the responsibility of COMPLETE OFC till handing over lies with the bidder. The COMPLETE OFC testing shall include the COMPLETE OFC terminated in FTC at each station.

13. The complete responsibility of the complete OFC shall be with the bidder till the handing over of the COMPLETE OFC to other contractor. Hence, if any fault or damage happens in the laid COMPLETE OFC before handing over, the same shall be rectified by the bidder without any implication to the IGGL/ MECON

C. <u>Other related work for COMPLETE OFC Laying:</u>

1. Supply and installation of 300 mm diameter OFC cable marker mounted on Main pipeline warning Marker. The 300 mm dia OFC cable marker shall be provided similar to the drawing of Joint Marker provided in the tender except that the joint number shall not be mentioned in cable marker.

2. Supply and installation of Separate OFC joint marker, electronic marker & marker locator etc., as per specification. The Joint marker shall be provided at each OFC Joint location (whether planned or un-planned). The electronic marker shall be provided at each OFC pit (both blowing pit and joint pit).

3. Supply, Installation, testing and commissioning of "JOINTING CLOSURE" as per standard specification.

4. Testing including OTDR Testing power testing complete cable section between two stations at 1310 nm and 1550 nm and testing of end sealing. The testing shall be done between two stations as per the channeling plan for all links and all fibres. The testing between two stations shall be done from both the directions and test results of average of the two shall be taken. The testing shall be as per the specification provided elsewhere in tender.

5. Supply of Special tools as per the specification.

6. Providing necessary Testing Tools and power supply at site for end to end splicing and testing etc.

7. All necessary civil works related to laying of COMLETE HDPE duct, COMPLETE OFC cable, installation of FTC, blowing pit, jointing Pit and all activities of Telecommunication work.

8. The Scope of laying contractor for COMPLETE OFC is upto handing over (after successfully testing as per specification) to the other telecom contractor. Any rectification work required related to laid OFC during defect liability period will be in the contractor's scope as specified in the contract documents.

9. Preparations and submission of As-built drawings with soft copy as per define in the specification.

10. After testing, reports has to be prepared in the format provided in Specification / Procedure for the Testing of Optical Fiber Cable enclosed with tender, SSD hard disks (3 sets) of all fiber OTDR traces, power test results, identification of fiber, loss etc has to be provided.

D. <u>General guidelines for laying of COMPLETE HDPE Duct / CONMPLETE OFC for telecommunication system:</u>

1. **The procurement of supply items will be done only after taking approval from client/ consultant /EIC as per the project requirements. SOR quantities may vary as per the actual requirements.**

2. **Bidder must submit the details of specific experience of the party responsible for OFC, HDPE Duct laying, jointing, splicing and testing. Sufficient documentary evidences also to be submitted at the**

time of submission of bid. The parties having proven experience and track record in respective field shall be allowed to execute the job.

3. OFC Blowing shall be linked to lowering of the Pipeline. The OFC blowing length shall be minimum 80% of the pipeline lowered length at the time of claiming of bill for Pipeline Laying & all OFC blowing shall be completed before gauge plate pigging run.

4. Report Number Shall be printed on each field report and shall not be written by hand or modified by hand in any case.

5. At the time of bill, each field report attached with the bill shall be stamped with "CLAIMED" seal. The reports against which the bills are raised shall all have "CLAIMED" seal stamped on them.

6. After award of work, Contractor shall supply 2 copies of detailed activity Bar chart, manpower and machinery mobilization plan, QA/ QC plan and inspection formats, execution procedures for different type of activities, for review and approval by the Engineer-in-charge within 15 days from the date of FOI (Fax of Intent) or 7 days of mobilization of work.

7. The OF cable & HDPE Duct alignment sheets (CAS) **to be submitted 15 days before final laying** to the Engineer-in-charge for approval which shall indicate various rail, road, canal, river & utility crossing, location of high tension lines running in parallel with the route of OFC, location of each of jointing locations & type of cable etc. **If contractor will start the work without taking approval of the OFC / duct alignment sheet then EIC / Client has full right not to accept laying work. The OFC drum length will be 4 KM ± 2.5 %. Same should be cross checked with actual drum length before finalizing the location of Jointing Pit in CAS preparation. Shorter length drums (less 4 KM - 2.5 %) if any shall be updated in CAS.** After completion of laying vendor shall submit "As Built Drawing" as define in the specification.

8. Testing of the complete cable section (end to end between two stations) to the satisfaction of IGGL/ MECON as per test schedule mentioned elsewhere in the tender document.

9. The contractor shall bring all duct & OFC laying, jointing, splicing equipment, tools as deemed necessary for the timely implementation of the work.

10. The Vendor shall use the data provided in the tender for reference purpose only. It shall be the Vendor's responsibility to check accuracy and utility of this data.

11. Special care should be taken to avoid any twist or damage of duct / OFC while laying Optical Fiber Cable under road, Nallah, Railway line, culvert as specified elsewhere in the tender document. At all river crossing locations, Blowing pit with proper OFC loop length at both the wide river bank end shall be provided. The jointing of OFC near river bank should be avoided.

12. For payment purpose HDPE casing /CS pipe casing for Nallah, River / Canal, railways, Major Road Crossing shall be referred in main line section SOR. Two ducts as per the schematics have to be laid in cased crossing; one duct shall be used for the present OFC blowing and other will be spare for future use.. However, at all HDD location of HDD length more than 500 meters, OFC shall be laid in both the HDPE ducts laid along with the HDD. This activity will be done along with the Main line.

13. **The cable-blowing pit similar to jointing pit shall be provided at every one KM distance. Payment will be made separately for cable blowing pit/ jointing pit as per SOR.**

14. Jointing, Splicing of OFC in jointing pit, testing, end sealing etc. has to be done. OFC loop should not be left without proper protection at any place. The OFC loop or surplus cable should be accommodated within the jointing pit / chamber. At each end the OFC & Duct shall be placed inside the pit with proper care**. No**

payments (for erection) will be done for the spare loops placed in the Blowing - Jointing pit / chamber etc.

15. If during the course of execution of work any discrepancy or inconsistency error or omission in any one of the provision of the contract is discovered which needs to be clarified, the same matter shall be referred to the IGGL/ MECON who shall give his decision in the matter and issue instruction then accordingly the work is to be carried out. The decision of the EIC / Consultant will be final and binding to contractor.

16. **The payments of supply & erection portion for HDPE Duct and OFC will be done as per contractual payment terms based on the payment's milestone defined in the pipeline laying work of the contract.**

17. For the **payment for laying, the payable length of optical fiber cable will be the length of pipeline as per pipeline chainages**. As applicable, for inside Terminal the actual laid length in separate trench upto control room will be considered for measurement. OFC route marker has to be provided inside the terminal area. No payments of OFC for erection will be done for the spare loops placed in the wire mesh etc.

18. Wastage is allowed as defined elsewhere in the tender documents.

19. Contractor shall take all safety measures required to prevent damage to the cable and accessories. The contractor shall be responsible for any damage to the cable, accessories and all other free issue items and existing underground services in route, if any.

20. Inspection of HDPE/ OFC has to be carried out by bidder appointed third party agency before dispatch of the material as per the approved QAP. All the cost of inspection shall be covered by the bidder and shall be included in the quoted price. No separate payment shall be done towards inspection. Client / Consultant will witness the testing and inspect the material as per QAP at manufacturer works for respective vendor.

21. As applicable near terminal OFC shall be laid inside duct upto telecom room in separate trench. The entry point & DUCT has to be properly sealed after laying of OFC to avoid entry of rodent, insect etc.)

22. At Tie – In locations:

    At all pipeline tie – in locations, the trench shall be excavated further and duct shall be laid approx 1 meter away from the pipeline to avoid damage to the duct.

23. **The Battery limit for the Telecommunication work shall be as defined above in the pipeline sections covered. This is only for the information purpose, may vary as per pipeline network.**

    Refer Pipeline Schematic Route Diagram

    Any work not defined below but required for the completion of Telecommunication work related to OFC laying within the scope of contractor & as per the instruction of Engineer In charge will be in laying contractor scope of the particular part. OFC work will be executed as per schematics.

    As applicable, in general the laying of OFC will start from the Control room of first station to Receiving Terminal, including DT, all SV stations, IP Station, RT station and any other station not mentioned here but indicated in pipeline schematic.

Enclosures:

LIST OF STANDARDS SPECIFICATIONS

Sl.No.	Standard Specification No.	Description	Remarks
1.	MEC/TS/05/E5/T/096 B	Technical Specification for Optical Fibre Cable & Accessories	
2.	MEC/TS/05/E5/T/037	Technical Specification PLB HDPE Telecom Duct and Accessories	
3.	Refer documents enclosed with Mechanical works	Technical specification of Warning Mats/ Mesh (common for pipeline & OFC)	

LIST OF STANDARDS SPECIFICATIONS

Sl.No.	Standard Specification No.	Description	Remarks
4.	MEC/S/05/E5/T/001A	GENERAL SPECIFICATION FOR HDPE DUCT LAYING AND TESTING	
5.	MEC/S/05/E5/T/001B	GENERAL SPECIFCATION FOR OFC LAYING, DRUM TESTING, OFC JOINTING & OFC TESTING	

LIST OF STANDARD DRAWINGS

S. No.	Standard Specification No.	Description	Remarks
1.	MEC/05/E5/T/002	Standard Sketch for OFC laying (OFC through HDPE) (Normal Terrain) ***	
2.	MEC/05/E5/T/002A	Standard Sketch for OFC laying (OFC through HDPE) (Rocky Terrain) ***	
3.	MEC/05/E5/T/005	Standard Drawing OFC Laying (Separate Trench) (OFC through HDPE)	
4.	MEC/05/E5/T/008	OFC Laying (Cased Crossing) (2 Nos. HDPE Duct)	
5.	MEC/05/E5/T/09A	Standard Sketch OFC Joining / Blowing Pit	
6.	MEC/05/E5/T/010	OFC Joint Marker	
7.	MEC/05/E5/T/016	Wire Mesh for OFC Termination	

If the common warning mat/ mesh has to be provided then refer the drawing no MEC/05/E5/T/02-WM for the distance between the OFC duct and the pipe. Same is applicable for all the terrain for lying of OFC.

VENDOR LIST FOR HDPE DUCT

1. M/s Kirti Industries (India) Ltd., Indore.
2. M/s Kulja Industries., Solan
3. M/s Veekay Plast, Jaipur
4. M/s Jain Irrigation Systems Ltd. Jalgoan
5. M/s Shree Mohit Industries, Burhanpur
6. M/s Duraline India Pvt. Ltd., Goa
7. M/s Vedanta Polymers

VENDOR LIST FOR OFC

1. M/s Finolex Cables Ltd, Pune
2. M/s UM Cables Limited, New Delhi
3. M/s Himachal Futuristic Communication Ltd., New Delhi
4. M/s Birla Ericsson Optical Ltd., Rewa
5. M/s Apar Cables (former M/s Uniflex Cables Lrd.), Mumbai
6. M/s Orient Cables, Bhiwadi
7. M/s Aksh Cables, Bhiwadi
8. M/s Sterlite Optical Technologies Ltd., New Delhi
9. M/s ARM Ltd., New Delhi
10. M/s Gupta Power, Bhubaneshwar

VENDOR LIST FOR JOINTING CLOSURES & ELECTRONIC MARKER / LOCATOR

1. M/s Raychem
2. M/s Telogica Ltd.
3. M/s Commscope
4. M/s 3 M

VENDOR LIST FOR FTC

1. M/s 3 M
2. M/s Raychem
3. M/s Krone
4. M/s Commscope

MECON LIMITED

QUALITY ASSURANCE PLAN

40/33 mm Pre-Lubricated HDPE Telecom Duct

QAP No	MEC/ 05/E5/T/HDPE/QAP/01 Rev.: 0
Date	
Project	
Owner/Client	
PMC	MECON LIMITED
Contractor	
Supplier	

Sl. No.	Component/ Operation	Type/ Method of Check	Instrument to Check	Sample Size/Frequency	Ref Standard	Acceptance Norms	Format of Record	Agency			Remark
								Manufacturer	TPI	MECON/ Client	
A)	**Raw Material Properties**										
1	Density	Measurement	Electronic Balance	Each Lot Size	IS : 7328-1992	0.940 to 0.958 g/cc at 27°C	RMTC	P	R	R	To be reviewed with the raw Material supllier test certificate
2	Melt Flow Rate (MFR)	Measurement	M.F.R Tester		IS : 2530-1963	0.2 to 1.1 gm/10 minute at 190°C & 5kg load	RMTC	P	R	R	
3	Oxidation Induction Time (OIT)	Measurement	DSC		TEC GR No.	30 minutes (Min.)	RMTC	P	R	R	
4	UV Stabilizer Content	Measurement	FT-IR Method		TEC GR No.	Hindered Amine Light Stabilizer minimum 0.15%	RMTC	P	R	R	
5	Ash Content of Colour M.B.	Measurement	Muffle furnace & Electronic Balance		TEC GR No.	Shall Not More than 12%	RMTC	P	R	R	
B)	**Dimensional & Visual Properties**										
1.1	Visual Appearance	Visual	-	Scale of sampling for visual and dimentional requirement as TEC GR No. Table-6	(Doc. No.- MEC/TS/05/E5/T/037/ Revision 1 dated-11.11.2006 & TEC GR No.TEC/GR/FA/CDS-008/04/AUG-19	Duct shall be free from blister,shrinks,holes,flaking,chips,scratches,roughness,break and other defects.Duct should be smooth and round in shape.The ends should be clearly cut & square with the axis of the duct.The thickness of inner layer shall be uniform through out the length and shall be white in colour.	Test report	P	W	W/R	
1.2	Colour of Duct	Visual	-			Orange with 4 white stripes of 3mm in longitudinal direction	Test report	P	W	W/R	
1.3	Inner Layer	Visual	-			White	Test report	P	W	W/R	
2.1	Outside Diameter	Measurement	Vernier Caliper			40 ± 0.4 mm	Test report	P	W	W/R	
2.2	Wall Thickness Pipe Thickness	Measurement	Micrometer			3.5 ± 0.2 mm	Test report	P	W	W/R	
2.3	Thickness of Inner Lubricant layer	Measurement	Traveling Microscope			0.28 to 0.42mm	Test report	P	W	W/R	
2.4	Ovality	Measurement	Vernier Calipers			≤ 1.4 *mm*	Test report	P	W	W/R	
2.5	Length	Measurement	Measuring Tape			Coil Length of 1000 ± 100m	Test report	P	W	W/R	

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		Date	
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		Owner/Client	
		PMC	MECON LIMITED
		Contractor	
		Supplier	

Sl. No.	Component/ Operation	Type/ Method of Check	Instrument to Check	Sample Size/Frequency	Ref Standard	Acceptance Norms	Format of Record	Agency			Remark
								Manufacturer	TPI	MECON/ Client	
2.6	Bending Radius	Measurement	Measuring Tape			20D Minimum	Test report	P	W	W/R	
C)	**Physical Properties**										
1	Heat Reversion test at 110 ± 2°C for 1 hr.	Measurement	Air Oven	Scale of sampling for as per TEC GR No. Table - 7	IS 4984 : 1995	Not Change more than 3% in longitudinal direction at 110 ± 2°C for 60 Min.	Test Report	P	W	W/R	
2	Environmental Stress Crack Resistance with 10% Igepal (Co-630) at 50 ± 1°C as per ASTM D 1693	Measurement	ESCR Bath		ASTM D 1693	The duct shall not crack or split. **when tested with 10% of Igepal (CO 630) solution at 50 ± 1°C for 96 hours.**		P	R	R	Internal Test Reoprt will be submitted for review
3	Ash Content of Duct	Measurement	Muffle furnace		As per TEC GR	shall be not more than 0.3%		P	W	W/R	
4	Fading of Colour	Measurement	Gibbs Apparatus		ASTM D 1712	No Discoloration		P	W	W/R	
5	Density of finished product	Measurement	Electronic Balance		IS 7328 : 1992	0.940 to 0.958 g/cc at 27°C		P	W	W/R	
6	Melt Flow Rate of finished duct	Measurement	M.F.R Tester		IS 2530 : 1963	0.2 to 1.1 gm/10 minute at 190°C & 5kg load		P	W	W/R	
7	Oxidation Induction Test	Measurement	DSC		As per TEC GR	30 min. (Minimum.)		P	W	W/R	
8	UV Stablizer of Duct (Type test)				As per TEC GR	UV Sabilizer content of finished duct shall not be more than 20%.	Type Test Report	P	R	R	BSNL TSEC Certificate/CACT report for similar type of duct for review
9	Hydraulic Characteristics (Acceptance Test) Sample length: 10 times of OD of the Duct	Measurement	Hydraulic testing M/c with pressure gauges & Hot Water Bath		IS 4984 : 1995	No leakage, swelling, weeping or crack after 48 hrs at 80°C, Induced Stress : 3.8 Mpa	Acceptance Test Report	P	W	R/W	
	Hydraulic Characteristics (Type Test) Sample length: 10 times of OD of the Duct					No leakage, swelling, weeping or crack after 165 hrs at 80°C, Induced Stress : 3.5 Mpa	Type Test Report	P	R	R	Internal Test Reoprt will be submitted for review
D)	**Mechanical Properties**										
1	Tensile Strength at yield & % of Elongation Test	Measurement	Tensile Testing M/c		IS 14151 Part- 1	Minimum 20 N/mm^2 & % Elongation 500% (M/c speed 50mm/mint.)		P	W	W/R	

MECON LIMITED	QUALITY ASSURANCE PLAN 40/33 mm Pre-Lubricated HDPE Telecom Duct	QAP No	MEC/ 05/E5/T/HDPE/QAP/01 Rev.: 0
		Date	
		Project	
		Owner/Client	
		PMC	MECON LIMITED
		Contractor	
		Supplier	

Sl. No.	Component/ Operation	Type/ Method of Check	Instrument to Check	Sample Size/Frequency	Ref Standard	Acceptance Norms	Format of Record	Agency			Remark
								Manufacturer	TPI	MECON/ Client	
2	Impact Strength Test	Visual	Impect Tester & Load 10 Kgs	scale of sampling No. Table - 7	IS 12235 Part-9	No Crack or Split	Test Report	P	W	W/R	
3	Crush Resistence Test	Measurement	Crush Resistence Tester		Doc. No. MEC/TS/05/ES/T/ 037 Revision 1 dated-11.11.2006 & TEC GR No. TEC/GR/FA/CDS-008/04/AUG-19	Max. 10% deflection with 50kgs load for 1min. & Max. 2% deflection after recovery in 5 min.		P	W	W/R	
4	Internal Co-efficient of Friction Test	Measurement	ICF Tester			For Nylon jacketed unarmoured OFC; <0.06		P	W	W/R	
5	Mandrel Test	Measurement	Mandrel			A 150 mm long mandrel of diameter 3 mm less than the Inner diameter of the Duct under test shall pass freely throughout 5M length of the Duct bent to a Radius of 5M		P	W	W/R	
6	Identification Marking & Colour	Visual	-			"Client Name" "Client LOGO" 40/33mm PLB HDPE Duct "Manufacturer Name" Sequential Length Marking at Every Meter (Including M/c No., DOM & Serial No. of the Duct)		P	W	W/R	
7	Coil Set Test	Measurement	Measuraing Tape			A minimum length of 50 meters duct taken from the coil and laid on the ground, It shall be straight without any bends or kink and without deformation, except 5 mtrs from each end.		P	W	W/R	Internal Test Reoprt will be submitted for review
8	OFC Blowing Test	Measurement	Blowing M/c	-		It shall be possible to blow in the OFC through the 1km duct (1km section shall include two couplings at suitable location), each time in not more than 35 minutes without any damage.	Type Test Report	P	R	R	BSNL TSEC Certificate/report for 40/33mm duct wil be submitted for review
E)	**HDPE Duct Accessories**										

MECON LIMITED

QUALITY ASSURANCE PLAN

40/33 mm Pre-Lubricated HDPE Telecom Duct

QAP No	MEC/ 05/E5/T/HDPE/QAP/01 Rev.: 0
Date	
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Owner/Client	
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Sl. No.	Component/ Operation	Type/ Method of Check	Instrument to Check	Sample Size/Frequency	Ref Standard	Acceptance Norms	Format of Record	Agency			Remark
								Manufacturer	TPI	MECON/ Client	
1	Coupler	Measurement/ Visual	-	-	Doc. No.- MEC/TS/05/ES/T/ 037 Revision-1 dated-11.11.2006 & TEC GR No. TEC/GR/FA/CDS/0 08/04/AUG-19	1) Pulling Force required to pull out two pieces of duct joined by the coupler should withstand 320kgf for 15 min. 2) Coupler shall pass pressure test of 15kg/cm^2 for 2hrs.	Test Report	P	W	W/R	
2	End Plug & Cable Sealing Plug	Measurement/ Visual	-			Fitment shall be smooth with the duct. End Plug and Cable Sealing Plug shall pass air pressure test of 1 bar for 30 min.	Test Report	P	W	W/R	
3	Ageing Test for Coupler, End Plug, Sealing Plug	Measurement/ Visual				Acceessories shall be aged for 168 hrs at 70°C, It shall pass the lightness test.	Test Report	P	R	R	Internal Test Report/Source Approval Certificate to be provided for review
4	End Cap	Measurement/ Visual	-			Duct shall be supplied with end caps on both the ends.	Test Report	P	W	W/R	

Note: Source of raw materials used for duct to be provided & same must be CACT approved

Prepared BY : **Reviewed/Approved BY :**

P - Performance, R - Review, W - Witness, V - Verification

MECON LIMITED	QUALITY ASSURANCE PLAN 24F (18F G.652D, 6F G.655) MULTI LOOSE TUBE DESIGN, DOUBLE SHEATH OPTICAL FIBRE CABLE	QAP No	MEC/05/28/GSPL/INST/QAP/009 Rev.: 0
		Date	
		Project	
		Owner/Client	
		PMC	MECON LIMITED
		Contractor	
		Supplier	

Sl. No	Activity Description	Description of Test	Test Frequency	Ref. Std & Cl. No.	Procedure No.	Acceptance Criteria	Document / Report	Agency		
								Vendor	TPIA	Mecon/ Client
A	**FOR BARE FIBRES AND RAW MATERIALS**									
1	Core (Mode Field) Diameter a) @ 1550 nm for G652D a) @ 1550 nm for G655	Geometry Test	100%	ITU-T G652D ITU-T G655	IEC 60793-1-45C	**for G.652D** 8.6 - 9.5 ± 0.7 µm @ 1310 nm **for G655** At 1550 nm: 8.0 ~ 11 µm	Fiber Supplier Test Certificate/Internal Test Report	R	R	R
2	Cut of Wavelength on 2 meter sample of fiber (In Cable)	Spectral Test	100%	ITU-T G652D ITU-T G655	IEC 60793-1-44A	For G652D: ≤ 1320 nm For G655: ≤ 1480 nm	Fiber Supplier Test Certificate/Internal Test Report	R	R	R
3	Attenuation Co- efficient @1310 nm @1550 nm @1625 nm	Attenuation Co-efficient Test (OTDR)	100%	ITU-T G652D ITU-T G655	IEC 60793-1-40C	**For G652D** At 1310 nm: ≤ 0.35 dB/km At 1550 nm: ≤ 0.20 dB/km **For G655** At 1550 nm: ≤ 0.21 dB/km At 1625 nm: ≤ 0.23 dB/km	Fiber Supplier Test Certificate/Internal Test Report	R	R	R
4a	Chromatic Dispersion a) 1285 - 1330 nm b) 1270 - 1340 nni c) Zero Dispersion wavelength d) Zero Dispersion Slope	Chromatic Dispersion	100%	ITU-T G652D	IEC 60793-1-42	**G652D** a) ≤ 3.5 ps/nm.km b) ≤ 5.3 ps/nm.km c) 1300 -1324 nm d) ≤ 0.093 ps/sqnm.km	Fiber Supplier Test Certificate/Internal Test Report	R	R	R
4b	Chromatic Dispersion a) 1530 - 1565 nm b) 1565 - 1625 nni c) Zero Dispersion wavelength d) Zero Dispersion Slope	Chromatic Dispersion	100%	ITU-T G655	IEC 60793-1-42	**G655** a) 0.1 ~ 6 ps/nm.km b) 4 ~ 11.2 ps/nm.km c) ≤ 1530 nm d) ≤ 0.093 ps/sqnm.km	Fiber Supplier Test Certificate/Internal Test Report	R	R	R
5	Geometrical Parameters a) Primary Coating Diameter b) Cladding Diameter c) Clad Non-Circularity d) Mode Field Concentricity Error	Geometrical Tests	100%	ITU-T G652D ITU-T G655	IEC 60793-1-20/21	a) 245 ± 10 µm b) 125 ± 1.0 µm c) ≤ 1% d) ≤ 0.8 µm	Fiber Supplier Test Certificate/Internal Test Report	R	R	R
6	Fibre PMD Maximum Individual fibre	PMD Test	100%	ITU-T G652D ITU-T G655	IEC 60793-1-49	≤ 0.2 ps/sqrt.km	Fiber Supplier Test Certificate/Internal Test Report	R	R	R
7	Fibre Proof Test	Fibre Proof Test	100%	ITU-T G652D ITU-T G655	IEC 60793-1-30	1%	Fiber Supplier Test Certificate	R	R	R
8	Fibre Curl	Fibre Curl Test	100%	ITU-T G652D ITU-T G655	IEC 60793-1-34	≥ 4m Radius Curve	Fiber Supplier Test Certificate	R	R	R
9	Attenuation Vs Wavelength @1525 - 1575nm (ref 1550nm)	Spectral Attenuation Test	100%	ITU-T G652D ITU-T G655	---	Shall be ≤ 0.03 dB/km	Fiber Supplier Test Certificate	R	R	R
10	Water Immersion test	---	5%	ITU-T G652D ITU-T G655	IEC 60793-53	Should Comply	Fiber Supplier Test Certificate	R	R	R

MECON LIMITED	QUALITY ASSURANCE PLAN 24F (18F G.652D, 6F G.655) MULTI LOOSE TUBE DESIGN, DOUBLE SHEATH OPTICAL FIBRE CABLE	QAP No	MEC/05/28/GSPL/INST/QAP/009 Rev.: 0
		Date	
		Project	
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		PMC	**MECON LIMITED**
		Contractor	
		Supplier	

11	**Buffering Compound (PBTP)**									
	Density	Density Meter	Supplier T.C	US 2782 Part-6		1.30 - 1.33 gm/cc	Supplier Test Report	P	R	R
	Tensile Strength at BK	Tensile Tester	Supplier T.C	ASTM-D-638		≥ 5.0 kg/mm^2	Supplier Test Report	P	R	R
	Elongation at Break	Tensile Tester	Supplier T.C	ASTM-D-638		≥ 50%	Supplier Test Report	P	R	R
12	**FRP Rod**									
	Dimensions	Vernier Caliper	Supplier T.C	---		2.0mm	Supplier Test Report	P	R	R
	Tensile Strength at BK	Tensile Tester	Supplier T.C	ASTM-D-3916		≥ 140 N/mm^2	Supplier Test Report	P	R	R
	Elongation at Break	Tensile Tester	Supplier T.C	ASTM-D-3916		≤ 4%	Supplier Test Report	P	R	R
13	**Filling Compound**									
	Drop Point	DP Tester	Supplier T.C	ASTM-D-566		≥ 150°C	Supplier Test Report	P	R	R
	Cone Penetration	Conepenetrometer	Supplier T.C	ASTM-D-217		@ 25°C ≥ 350°C @ -30°C ≥ 230°C	Supplier Test Report	P	R	R
	Flash Point	---	Supplier T.C	ASTM-D-93		≥ 200°C	Supplier Test Report	P	R	R
14	**Water Swellable Yarn**									
	Swelling Speed	---	Supplier T.C	---		> 25 ml/gm/min	Supplier Test Report	P	R	R
	Swelling Capacity	---	Supplier T.C	---		> 35 ml/gm/10 minute	Supplier Test Report	P	R	R
15	**Water Swellable Tape**									
	Thickness	Micrometer	1 Sample/LOT	---		0.15 mm Min.	Supplier Test Report	P	R	R
	Width	Vernier Caliper	1 Sample/LOT	---		24 ± 2.0 mm	Supplier Test Report	P	R	R
16	**ECCS Tape**									
	Thickness	Micrometer	1 Sample/LOT	---		0.15 mm Min.	Supplier Test Report	P	R	R
	Tensile Strength	Tensile Tester	Supplier T.C	ASTM A 370-97a		≥ 30 kg/mm^2	Supplier Test Report	P	R	R
	Elongation at Break	Tensile Tester	Supplier T.C			≥ 35%	Supplier Test Report	P	R	R
17	**MDPE (Inner Sheath)**									
	Density	Density Meter	Supplier T.C	BS 2782 Part-6		0.926 - 0.940 gm/cc	Supplier Test Report	P	R	R
	Tensile Strength at BK	Tensile Tester	Supplier T.C	ASTM-D-638		≥ 1.22 kg/mm^2	Supplier Test Report	P	R	R
	Elongation at Break	Tensile Tester	Supplier T.C	ASTM-D-638		≥ 300 %	Supplier Test Report	P	R	R
	HDPE (Outer Sheath)									
	Density	Density Meter	Supplier T.C	BS 2782 Part-6		0.94 - 0.96 gm/cc	Supplier Test Report	P	R	R

MECON LIMITED	QUALITY ASSURANCE PLAN 24F (18F G.652D, 6F G.655) MULTI LOOSE TUBE DESIGN, DOUBLE SHEATH OPTICAL FIBRE CABLE	QAP No	MEC/05/28/GSPL/INST/QAP/009 Rev.: 0
		Date	
		Project	
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		PMC	**MECON LIMITED**
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		Supplier	

18	Melt Flow Index	MFI Tester	Supplier T.C	BS 2782 Part (Method 720A) ASTM-D-1238		≤ 0.8 gm/10 min	Supplier Test Report	P	R	R
	Tensile Strength at BK	Tensile Tester	Supplier T.C	ASTM-D-638		≥ 2Kg/mm^2	Supplier Test Report	P	R	R
	Elongation at Break	Tensile Tester	Supplier T.C	ASTM-D-638		≥ 600%	Supplier Test Report	P	R	R
B	**FOR FINISHED CABLES**									
1	**Visual Inspection** a) Cable layup and fibre identification b) Identification and length marking on outer jacket c) Overall diameter of the cable d) Colour contrast of the marking with the outer sheath of the Cables e) Cable Weight (kg/km) f) Inner & Outer sheath thickness	Visual Tests & Dimensional Test	5%	As per approved cross-sectional design/data sheet	As per approved cross- sectional design/data sheet	As per approved cross- sectional design/data sheet	Test Report	P	W	W/R
2	Test on Moisture Barrier a) Thickness of layer b) Extent of overlapping	Physical verification	5%	As per approved cross-sectional design/data sheet	As per approved cross- sectional design/data sheet	≥ 0.025 mm ≥ 10% of tape width	Test Report	P	W	W/R
3	Test on steel tape armour a) Thickness of layer b) Extent of overlapping c) Electrical Continuity of layer	Physical verification	5% 5% 100%	As per approved cross-sectional design/data sheet	As per approved cross- sectional design/data sheet	≥ 0.15 mm ≥ 10% of tape width Continuous	Test Report	P	W	W/R
4	Attenuation (OTDR) Test a) @1310nm & 1550nm for G652D b) @1550nm & 1625nm for G655	Attenuation coefficient test (OTDR)	100%	ITU-T G652D ITU-T G655	IEC 60793-1-40C	**For G652D** @1310nm: ≤ 0.37 dB/km @1550nm: ≤ 0.22 dB/km **For G655** @1550nm: ≤ 0.24 dB/km @1625nm: ≤ 0.26 dB/km	Test Report	P	W	W/R
5	Tensile Performance (Tensile load of 1x9.81xW Newton; Where W = weight of 1Km Cable in Kg)	Tensile Test	5%	IEC - 794 - 1 - E1	IEC - 794 - 1 - E1	Fibre Strain: ≤ 0.25% Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R
6	Crush Test (200 Kg of load to be slowly placed and held for 60 sec)	Crush Test	5%	IEC - 794 - 1 - E3	IEC - 794 - 1 - E3	Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R

MECON LIMITED	QUALITY ASSURANCE PLAN 24F (18F G.652D, 6F G.655) MULTI LOOSE TUBE DESIGN, DOUBLE SHEATH OPTICAL FIBRE CABLE	QAP No	MEC/05/28/GSPL/INST/QAP/009 Rev.: 0
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7	Impact (Mass of 5 Kg to fall freely from 0.5 meters height on the cable sample 10 times repeatedly with a gap between 1 impact to another approx. at 60 sec)	Impact Test	5%	IEC - 794 - I - E4	IEC - 794 - I - E4	Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R
8	Torsion (Weight of 7.5Kg attached to the stationary chuck and shall be twist on ±180°, subjected to 10 cycles)	Torsion Test	5%	IEC - 794 - 1 - E7	IEC - 794 - 1 - E7	Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R
9	Cable Bend (To be performed preferably with procedure 1(of IEC) with a mandrel diameter of 24 D, where D is the diameter of the cable and testing shall be done with 4 turns of cable wrapped and then unwrapped for 10 complete cycles)	Bend Test	5%	IEC - 794 - 1 - E11 Procedure I	IEC - 794 - 1 - E11 Procedure I	Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R
10	Repeated Bending (20 times with weight of 5 Kg)	Bend Test	5%	IEC 60794 - I - 2-E6 /EIA - 455- 104	IEC 60794 - I - 2-E6 /EIA - 455- 105	Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R
11	Kink (Radius: 10 x Cable Diameter)	Kink Test	5%	IEC - 794 - 1 - EI0	IEC - 794 - I - E10	No Kink shall occur Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R
12	Temperature Cycling (1 hr at room temp., 12 hrs at 0°C, 12Hrs at +65°C and 1 hr from 65°C to room temperature)	Environmental Test	5%	IEC - 794 - 1 - F 1	IEC - 794 - 1 - F 1	Change in Attenuation ≤ 0.05 dB/Km	Test Report	P	W	W/R
13	Water Penetration (3m sample, I meter water head for 24 Hrs.)	Water Penetration Test	5%	IEC - 794 - 1 - F 5	IEC - 794 - 1 - F 5	No Seepage of water from other end	Test Report	P	W	W/R
14	Abrasion Test (The cable surface shall be abraded with a needle, Number of cycles: 20)	Abrasion test	5%	IEC - 794 - I - E2/ASTM D-790	IEC - 794 - I - E2/ASTM D-791	There shall be no perforation and loss of legibility of the marking on the sheath.	Test Report	P	W	W/R
15	Sheath integrity Test (Spark Test) at 8kV rms or 12 KV DC	Spark Tester	5%	IEC - 794 - 1 - F 3	IEC - 794 - 1 - F 3	No spark	Test Report	P	W	W/R
16	ESCR on outer sheath at 50°C ± 1°C for 48	Water Bath	5%	ASTM D 1693	ASTM D 1693	No cracks	Test Report	P	W	W/R
17	Flexural Rigidity Test on the optical fibre cable	Type Test	5%	To be tested as per ASTM D-790	To be tested as per ASTM D-790	As per Job Specification	Test Report	P	R	R

18	Test of Figure of 8 (Eight) on the cable	-	5%	As per Job specification/ TEC Standards	As per Job specification/ TEC Standards	As per Job Specification	Test Report	P	W	W/R
19	Cable Aging Test	Type Test	5%	As per Job specification/ TEC Standards	As per Job specification/ TEC Standards	As per Job Specification	Test Report	P	R	R
20	Static Bend Test	Bend test	5%	As per the clause no. 13.8 of the GR alternatively as per ASTM D 790	As per the clause no. 13.8 of the GR alternatively as per ASTM D 790	As per Job Specification	Test Report	P	W	W/R
21	Check of easy removal of sheath	-	-	As per Job specification/ TEC Standards	As per Job specification/ TEC Standards	As per Job Specification	Test Report	P	W	W/R
22	Effect of aggressive media on the cable surface (Acidic and Alkaline behaviour)	-	-	As per Job specification/ TEC Standards	As per Job specification/ TEC Standards	As per Job Specification	Test Report	P	R	R
23	Check of the Quality of the Loose Tube (Containing Optical Fibre)	-	-	As per Job specification/ TEC Standards	As per Job specification/ TEC Standards	As per Job Specification	Test Report	P	W	W/R
24	Drainage Test for Loose Tube and Drip Test on the Cable	-	-	As per Job specification/ TEC Standards	As per Job specification/ TEC Standards	As per Job Specification	Test Report	P	W	W/R
25	Snatch Test	-	-	IEC 794-1-E9	IEC 794-1-E9	As per Job Specification	Test Report	P	W	W/R

Note:

1	IN CASE OF CONFLICT BETWEEN OWNER SPECIFICATIONS, TENDER DOCUMENTS AND QAP, MORE STRINGENT CONDITIONS SHALL BE APPLICABLE.
2	ACCEPTANCE NORMS/ ACCEPTANCE CRITERIA FOR ALL THE ACTIVITIES SHALL BE AS PER RELEVANT/ JOB SPECIFICATION / STANDARD SPECIFICATION/ DATA SHEETS/ APPLICABLE CODES &STANDARDS ETC. REFERRED THERE IN /JOB SPECIFICATION /APPROVED DOCUMENTS.

MECON LIMITED	QUALITY ASSURANCE PLAN 24F (18F G.652D, 6F G.655) MULTI LOOSE TUBE DESIGN, DOUBLE SHEATH OPTICAL FIBRE CABLE	QAP No	MEC/05/28/GSPL/INST/QAP/009 Rev.: 0
		Date	
		Project	
		Owner/Client	
		PMC	MECON LIMITED
		Contractor	
		Supplier	

3	REFERENCE DOCUMENTS ARE RELEVANT JOB SPECIFICATIONS/ STANDARD SPECIFICATIONS/ DATA SHEETS/ APPLICABLE CODES & STANDARDS
4	CONTRACTOR TO NOTE THAT, UNDER NO CIRCUMSTANCES SHALL ANY APPROVAL OF THE OWNER/OWNER'S REPRESENTATIVE RELIEVE THE CONTRACTOR RESPONSIBILITY FOR MATERIAL, DESIGN, QUALITY ASSURANCE AND THE GUARANTEED PERFORMANCE OF THE SYSTEM/EQUIPMENTS AND ITS CONSTITUENTS.
5	CONTROL AUTHORITY/OWNER CONSULTANT SHALL REVIEW ALL TEST FOR OFC CABLE.

Prepared BY : **Reviewed/Approved BY :**

List of Special Tools and Tackles for OFC:

The bidder shall fill quoted for the list provided against each item in the un-priced offer of the bid (Bidder is required to quote for all items in this bid document) (supply if applicable; refer MR)

Special Tools and Tackles

Optical Fibre Cable preparation tool kit (Each set consisting of followings)

1.	Three Wheel cutter (HDPE/ MDPE/ CSTA/ ECCS etc. accurately	1 No.
2.	Sheath Cutter (for cutting sheath)	1 No.
3.	Adjustible torgue wrench with adopter	1 No.
4.	Adjustible Knife	1 No.
5.	Hack-Saw (small)	1 No.
6.	Armour punch	1 No.
7.	Measuring tape - SS (3 meters)	1 No.
8.	L-N key	1 No.
9.	Cable Cutter	1 No.
10.	Crosshead screw driver	1 No.
11.	Flat head screw driver	1 No.
12.	Combination Plier	1 No.
13.	Scissors	1 No.
14.	Flat spanners	1 No.
15.	Loose tube cutter	1 No.
16.	Stripper	1 No.
17.	V-Groove	1 No.
18.	Installation kit for splice closures	1 No.
19.	Fibre Cleaver (Diamond cutter)	1 No.
20.	5 Meter pigtails with FC/ PC Connector at one end	1 No.
21.	10 meter patch cord with FC/PC Connector at both end	1 No.

2 sets of documentation for Technical literature for Tools and Tackles and user manuals shall be provided.

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Annexure-VI
to
Particular Job Specification
(ELECTRICAL WORKS)

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2	Scope of Work for Electrical system	MEC/05/E9/E/E0085/E/SOW/001	Rev. 0
3	Electrical Check List	-	Rev. 0
4	List of Tool Kits and instruments- Annexure A	-	Rev. 0
5	List of Suppliers of Major bought out items	-	Rev. 0
6	Quality Assurance Plan for Electrical system	MEC/05/E9/E/E0085/E/QAP/001	Rev. 0
7	Inspection Categorization Plan	-	Rev.0
8	PJS-Solar System	MEC/E0079/05/E9/E/003	Rev.0
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10	Standard Specification of Electrical System	-	-
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11	Tender Drawings of Electrical System	MEC/05/E9/E/E0085/E/SLD	0
12	Standard Drawings of Electrical System	-	-

INDRADHANUSH GAS GRID LIMITED

DESIGN BASIS FOR ELECTRICAL SYSTEM

DULIAJAN FEEDER LINE (FROM CGGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)

(ELECTRICAL SECTION)
MECON LIMITED DELHI

Document No.	Revision No.	Date
MEC/05/E9/E/0085/E/CPDB/001	R-B	30.07.2026
MEC/05/E9/E/0085/E/CPDB/001	R-A	07.06.2026

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7.0	AREA CLASIFFICATION & EQUIPMENT SELECTION
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14.0	DRWINGS AND DESIGN DOCUMENTS
15.0	LOAD LIST (ANNEXURE-I)

Rev. No.	Date	Prepared By	Checked By	Approved By
B	30.07.2026	Pradipta Ranjan, Dy. Mgr. (Elect)	Aashis Moyal, AGM (Elect)	Pankaj Srivastava, Sr GM I/c (E&I)

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1.0 INTRODUCTION

Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, GAIL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. As per Hydrocarbon Vision 2030 for North East India, North East Gas Grid (NEGG), a natural gas pipeline network, is being set up to connect the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni Guwahati Gas Pipeline. The project is being implemented in three phases based on the requirement of statutory clearance, route terrain, linkage with Highway corridor widening works, difficulty in work execution etc. for the development of a gas-based economy in North-Eastern India.

As per the mandate of the Cabinet Committee on Economic Affairs (CCEA), the NEGG is to connect all the eight Northeastern states to the National Gas Grid for the development of a gas-based economy in the Northeast in line with the Hydrocarbon Vision 2030 for the Northeast. It is also mandated by the CCEA to connect all the regional gas sources of the Northeast for early monetization of natural resources and to boost Exploration & production (E&P) activities in the region.
The natural gas pipeline grid would have the facility for injection of indigenously produced gases also. Connectivity from local marginal fields as well as source line/spur lines into North-East Gas Grid has been considered. The upstream source/ pipeline operator would make necessary arrangements for availability of requisite pressure at source for gas injection into the grid, as per the hydraulics.

M/s IGGL has awarded M/s MECON Limited as project management consultancy (PMC) services for proposed 24″NB X 176.120 Kms. (appx.) cross-country pipeline from Dispatch Terminal at CGGS Madhuban of OIL to existing SV-14 of GNPL at Jorhat-IGGL connectivity along with associated facilities. The Scope also includes a proposed 24″NB X 6.100 Kms. (appx.) cross-country pipeline from Dispatch facility at BCPL Lepetkata Plant to receiving (cum injection point) at Jokai Lepetkata along with associated facilities. The total proposed pipeline length is 24″ NB × 182.220 km (appx.). Salient features of the Project are as below:

Product: NG
Pipeline Size: 24”
Pipeline Coating -3LPE
Refer table-1 for details of pipeline under this package.

Pipeline	Location		Diameter/ Design pressure	Approx. Length (Km)
	From	To		
Duliajan Feeder line	DT at CGGS Madhuban Ch 0.00km (Existing DT)	RT at (SV-14 of GNPL at Jorhat-IGGL connectivity) Ch 174.236 km (Existing RT)	As per Process design basis	174.236 KM (Approx.)

Pipeline	Location		Diameter/ Design pressure	Approx. Length (Km)
	From	To		
Injection point for Lepetkata, Jokai to Source BCPL Lepetkata plant	DT at Source BCPL Lepetkata plant Ch 0.00km	Injection point for Lepetkata, Jokai Ch 46.830 km	As per Process design basis	6.027 KM (Approx.)

Table-1, Pipeline details

This document presents design criteria for Electrical system. It indicates minimum requirements for detailed design of Electrical system and equipment.

In case of any conflict between the design basis &codes/ standards listed, the same shall be brought to the notice of Owner/Consultant for final decision, stringent of the same shall be followed without any additional time and cost to IGGL.

2.0 ELECTRICAL SYSTEM DESIGN

2.1 Power requirement:

DJPL PIPELINE PROJECT (Refer load list Annexure-1)					
STATION	DT at OIL Duliajan	SV station (SV-01,02,03,04, 05,06,07,08,09)	D/T source at Lepetkheta	IP-01	RT at SV-14 Jorhat
Maximum Demand	95KVA	33KVA	41 KVA	50KVA	Existing solar system / electrical installation shall be used

Table-2, Power requirement of each station.

2.2 The following electrical equipment / systems are envisaged for:

2.2.1 <u>Dispatch Facility at OIL CGGS Madhuban (Ch. 0.0 kms.):</u>

Existing system details-

Dispatch Terminal at OIL is an existing facilities of M/s OIL.

A. Main Electrical Power requirements-

I) Power requirements at DT for complete electrical load of new pipeline facilities shall be met through the existing power supply at OIL facilities though existing PDB Panel. (415V power supply PDB details, feeder rating and feeder no. to be provided by M/s IGGL)

II) One no. new 415V PDB for receiving normal power from existing PDB/PCC/MCC panel at DT CGGS Madhuban shall be considered for this pipeline.

B. Critical Power requirements-

I) Critical power requirements for additional critical loads (SCADA, Instrumentation, CCTV, Fire, PCP & Telecom) of DFL pipeline at DT CGGS Madhuban shall be met through new UPS system.

UPS System-

One no. new Dual Parallel Redundant UPS system with static by - pass and Ni-Cd type battery bank (for 12 hours battery back-up) for Instrumentation, SCADA and PCP loads at DT CGGS Madhuban with ACDB, DC-DC converter, DCDB for critical power supply to SCADA, Instrumentation, telecom & CP system etc.

II) Silent DG set-
DG set has not been considered.

C. General requirements

I) LT Power and Control cables, as required as per cl no 10 of this document.

II) Outdoor lighting (For Classified and Non-Classified area & Buildings), as required for DFL Process area.

III) Indoor and Outdoor Emergency/Critical lighting system though inverter system @ 230V AC (with 4 hrs battery system).

IV) Split AC system, stabilizer with 12 hrs. timer.

V) Complete Earthing and Lightning protection system.

VI) APFC system in PDB – As per SLD (3 Step), interlocked with DG set.

VII) Lighting Distribution board (OLDB, IELDB & PP-LDB).

VIII) Solar based standalone Type Street lighting system for outdoor emergency lights at SV and tap-off.

IX) Earthing and Lightning protection system.

Lighting protection system as per IEC 62305 (LPL-II shall be considered for the Oil & Gas installations).

The earthing system shall be designed as per latest revisions of applicable standards such as IS: 3043:2018, IEEE: 80.

X) Lighting Distribution board (OLDB, IELDB & PP-LDB).

XI) Automatic Voltage Regulator (AVR), Outdoor type, Input Voltage of (320V-490V), Output Voltage of 433V, including two no's Change Over switch (COS).

XII) Structural steel, cable tray, erection accessories etc. as required.

XIII) All panels like UPS, Switch board, MFM meter of PDB/LDB shall be equipped with mod-bus communication (RS485/ Ethernet TCP/IP) for remote monitoring, as required.

2.2.2 PROPOSED SV-1, SV-2, SV-3, SV-4, SV-5, SV-6, SV-7, SV-8 & SV-9 (Remotely Operated) & IP station:

A. Main electrical power requirement-

I) Pole mounted HT substation (11/0.433 KV, LA, DO fuse, metering etc.) for receiving Grid power from State Electricity Board. (Power supply to these stations)

II) 63KVA, 11/0.433 kV ONAN distribution transformer with HT cable termination box on primary side & LT cable termination box on secondary side.

III) 415V Switch Board/PDB for receiving normal power at SV station.

B. Critical Power requirements-

I) Existing 98V solar system with Ni-Cd type battery bank with 3-day autonomy (**for 72 Hours back-up**), FCBC charger system with DC-DC converter are available in various IGGL stores and it shall be shifted to each SV stations from IGGL store to carter critical load (PCP, Instrumentation, SCADA and telecom & other critical loads. Charger system voltage shall be 96 V). Existing Battery Charger shall be used for the charge the battery, which has been designed in such manner that if all 3 Phase healthy- 100% charging capacity, 2 Phase healthy -66% charging capacity, 1 Phase healthy -33% charging capacity. Charger will work even 1 single phase is healthy. Solar system shall be considered for SV station.

II) UPS System-
One no. new Dual Parallel Redundant UPS system with static by - pass and Ni-Cd type battery bank (for 6 hours battery back-up) for Instrumentation, SCADA and PCP loads at DT Duliajan with ACDB, DC-DC converter, DCDB for critical power supply to SCADA, Instrumentation, telecom & CP system etc. UPS system shall be considered for IP station.

III) Silent DG set-

58.5 KVA Silent Diesel Generator set for the power back up at each SV & IP station.

C. General requirements

I) Solar based standalone Type Street lighting system for outdoor emergency lights at SV and tap-off.

II) Split AC system, stabilizer with 12 hrs. timer.

III) LT Power and Control cables, as required as per cl no 10 of this document.

IV) APFC system in PDB – As per SLD (3 Step), interlocked with DG set.

V) Indoor & Outdoor lighting (Classified and Non-Classified type), All fixtures for battery room are classified type including the ventilation system with operation of all fixtures from outside the room.

VI) Indoor and Outdoor Emergency/Critical lighting system though inverter system @ 230V AC (with 4 hrs battery system).

VII) Earthing and Lightning protection system.

Lighting protection system as per IEC 62305 (LPL-II shall be considered for the Oil & Gas installations).

The earthing system shall be designed as per latest revisions of applicable standards such as IS: 3043:2018, IEEE: 80.

VIII) Lighting Distribution board (LDB, OLDB, ILDB & PP-LDB).

IX) Automatic Voltage Regulator (AVR), Outdoor type, Input Voltage of (320V-490V), Output Voltage of 433V, including two no's Change Over switch (COS).

X) Structural steel, cable tray, erection accessories etc. as required.

XI) All panels like Battery Charger, UPS, Switch board, AMF panel shall be equipped for (RS485/ Ethernet TCP/IP) communication for remote monitoring.

2.2.3 Dispatch Facility at (Source BCPL Lepetkata plant) (Ch. 0.0 kms.):

Existing system details-

I. Existing Terminal at BPCL Lepetkata is an existing facilities of M/s BCPL. (Kindly provide details of the existing electrical power is being used for this station or separate electricity connection needs to be considered).

A. Main electrical power requirement-

I) Pole mounted HT substation (11/0.433 KV, LA, DO fuse, metering etc.) for receiving Grid power from State Electricity Board. (Power supply to these stations)

II) 63KVA, 11/0.433 kV ONAN distribution transformer with HT cable termination box on primary side & LT cable termination box on secondary side.

III) 415V Switch Board/PDB for receiving normal power at DT station.

B. Critical Power requirements-

I) Critical power requirements for critical loads (SCADA, Instrumentation, CCTV, Fire, PCP & Telecom) of DFL pipeline at DT Lapetkheta shall be met through new UPS system.

UPS system-
One no. Single UPS system with static by – pass, Auto Health phase selector module and SMF-VRLA type battery bank (for 3 hours battery back-up) for Instrumentation, SCADA and PCP loads at DT (Lepetketa) with ACDB, DC-DC converter, DCDB for critical power supply to SCADA, Instrumentation, telecom & CP system etc.

II) Silent DG set-
Silent DG set is not considered. Power backup at DT-Lapetkheta has been considered from existing DG set system of BCPL.

C. General requirements

I) LT Power and Control cables, as required.

II) Outdoor lighting (For Classified and Non-Classified area & Buildings), as required for DFL Process area.

III) Indoor and Outdoor Emergency/Critical lighting system though inverter system @ 230V AC (with 4 hrs battery system).

IV) Solar based standalone Type Street lighting system for outdoor emergency lights at SV and tap-off.

V) Split AC system, stabilizer with 12 hrs. timer.

VI) APFC system in PDB – As per SLD (3 Step), interlocked with DG set.

VII) Earthing and Lightning protection system.

Lighting protection system as per IEC 62305 (LPL-II shall be considered for the Oil & Gas installations).

The earthing system shall be designed as per latest revisions of applicable standards such as IS: 3043:2018, IEEE: 80.

VIII) Lighting Distribution board (OLDB, IELDB & PP-LDB).

IX) Automatic Voltage Regulator (AVR), Outdoor type, Input Voltage of (320V-490V), Output Voltage of 433V, including two no's Change Over switch (COS).

X) Structural steel, cable tray, erection accessories etc as required.

XI) All panels like UPS, Switch board, MFM meter of PDB/LDB shall be equipped with mod-bus communication (RS485/ Ethernet TCP/IP) for remote monitoring, as required.

2.2.4 Receiving Terminal at SV-14 of GNPL:

A. Main Electrical Power requirements-

Receipt Terminal at SV-14 located on existing GNPL pipeline, is an existing SV station of M/s IGGL.

Power requirements at RT for complete electrical load of new pipeline facilities shall be met through the existing PDB/MCC/PCC Panel at SV-14 station.

B. Critical Power requirements-

Critical power requirements for additional critical loads (SCADA, Instrumentation, CCTV, Fire, PCP & Telecom) of DJPL pipeline at RT shall be met through existing 2000 W solar system installed at SV-14.

C. General requirements

I) LT Power and Control cables, as required as per cl no 10 of this document.

II) Outdoor lighting (Classified and Non-Classified type)

III) Outdoor Emergency/Critical lighting system though existing inverter system @ 230V AC.

IV) Earthing and Lightning protection system.

Lighting protection system as per IEC 62305 (LPL-II shall be considered for the Oil & Gas installations)
The earthing system shall be designed as per latest revisions of applicable standards such as IS: 3043:2018, IEEE: 80.

V) Structural steel, cable tray, erection accessories etc. as required.

3.0 CODES AND STANDARDS

Electrical equipment and system design, manufacture, testing, installation and commissioning will comply with all the latest applicable standards, regulations and codes as mentioned below:

BIS	-	Bureau of Indian Standards
CMIFR	-	Central Mining Institute & Fuel Research
DGMS	-	Director General Mines Safety
OISD	-	Oil Industrial Safety Directives
IEEE	-	Institute of Electrical & Electronics Engineer
IER	-	The Indian Electricity Rules
ANSI	-	American National Standards Institute
BEE	-	Bureau of Energy Efficiency, India
IEC	-	International Electro technical Commission

Note- M.B. Lal Committee recommendation to be followed in all electrical design & installations.

3.1 In case of imported equipments standards of the country of origin shall be applicable if these standards are equivalent or stringent than the applicable Indian standards.

3.2 The equipment shall also confirm to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.

3.3 In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern.

- Statutory regulations.
- Data sheets.
- Scope of Work/ Job specification.
- Design Basis.
- Standard Specification.
- Codes and standards.

4.0 OPERATING REQUIRMENT

A.C. Power Supply

a) Voltage - 415 V +10 %, -15%

b) Frequency - 50 Hz +/- 5 %

c) Phases and Wire - 3 Ph & N (4W)
1 Ph & N (2W)

d) Fault level - 30 KA for 1 Sec. For 3 Ph ckt.
10 KA for 1 Sec. For 1 Ph ckt.

e) Neutral Earthing - Solidly Earth

Critical Power (UPS/Charger) Supply Parameters:

Sr No.	Description/Terminal	DT/IP/RT Station	SV station
1	INSTRUMENTATION	230 V AC UPS, 24 V DC	230 V AC NON- UPS 24 V DC
2	TELECOM SYSTEM	230 V AC UPS, (-)48 V DC	230 V AC NON- UPS (-) 48 V DC
3	SCADA	230 V AC UPS, 24 V DC	230 V AC NON- UPS 24V DC
4	CP SYSTEM	230 V AC NON- UPS	48 V DC
5	FA & CO2 Flooding system	24 V DC	24 V DC
6	MOV/Actuator	230 V AC UPS	230 V AC NON-UPS
7	Critical Lighting	230V AC by Inverter	230 V AC by Inverter
8	FEP/CCTV/EPABX	230 V AC UPS	N/A

5.0 LIGHTING SYSTEM

5.1 Lux level in the plant area for calculation of lighting fixture is as follow:

Area	Required Lux Level (As per M.B. Lal Committee)	Lighting Technology
Primary Roads	10-20	LED street lights (Except Hazardous Area)
Secondary Roads	5-10	LED street lights (Except Hazardous Area)
Pump Houses (Product Pump Houses), T/W Pumps, Sheds	100-150	LED lights With flame proof fittings
Main Operation Platform & access stairs (within tank farm)	60-80	LED lights With flame proof fittings
Ordinary Platforms	20-50	LED Pole Mounted fittings

Parkinng Area	20-50	LED Pole Mounted fittings
Process Ares	60-100	LED With flame proof fittings
Switchgear Bldg/ MCC Room/ DG Room/Shed	150-200	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Transformer Bay/ Switchyard	100-200	LED Pole Mounted fittings
Battery room	150-200	1x40W FTL/LED Flame Proof lighting fixture Recessed/ Surface mounting and flame Proof type Exhaust fan. (All switching outside the battery room)
Control Room bldg/ Laboratory	400-500	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Charger/UPS room	150-200	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Warehouse	100-150	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Office room	300-400	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Watch room/ Watchman Booth	100-150	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Stairs	50-70	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Corridors	70-100	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)
Fire House/ Garage	100-150	9W, 12W, 18W, 36W LED Lights (Recessed/Surface fixtures)

Factor of Safety- HPMV -20 %
LED/Induction -10%

All electrical fixtures for Hazardous area shall be classified type (Flame proof) as per the Area Classification given in this document and have approval of respective statutory

agency as per the Petroleum Act, 2002.

Security Gate Lighting - Integral LED Post Top Lantern

5.2 Emergency lighting system for indoor & outdoor lighting by separate Inverter system.

6.0 SITE CONDITIONS

a) Max / Min Temperature : 50 / 2 ˚C (max/min)

b) Relative Humidity : 95 %

c) Altitude above sea level : Less than 1000 M above mean sea level

d) Atmospheric condition : To withstand site condition (Dry, dust storms during summer, Humid & Heavy Rainfall during Monsoon)

e) Hazardous area Classification : Zone-I & II, Gas group IIA & IIB, Temp. Class T3

f) Control Room/Electrical /D. G Area/Transformers Yard etc. : Safe Area

7.0 AREA CLASIFFICATION AND EQUIPMENT SELECTION

Classification of hazardous area will be in accordance with BIS and IS: 5572.

Following selection will be considered for proper selection of electrical equipment for use in hazardous area:

a) Area Classification : Zone-I & II

b) Gas Group : IIA and IIB

c) Temperature Classification : T3

All electrical equipment installed in hazardous area will be selected as per IS: 5571.

All the electrical equipment for hazardous areas shall be of Ex-d type suitable for temp classification T3 and shall be certified by CMRI or equivalent independent testing agency and shall have valid PESO license.

8.0 ENCLOSURE PROTECTION OF EQUIPMENT

8.1 Enclosure Protection: -

The electrical equipment installed outdoor will have the following enclosure Protection

- IP 65

The equipment installed indoors will have the following enclosure:

UPS - IP 31
PDB – IP 54

The above enclosure protection will be in accordance with Indian standard.

8.2 Enclosure Protection in hazardous areas: -

The type of enclosure in the plant / process area shall be Flame proof (Ex-d)

9.0 EARTHING AND LIGHTNING PROTECTION SYSTEM

9.1 Soil Resistivity test up to 15mtr depth by Wenner's 4 pin method shall be carried out by the Bidder, accordingly Earthing and Lighting calculation shall be prepared by the Bidder & submitted for approval.

9.2 Lighting protection system as per IEC 62305 and OISD-180 (LPL-II shall be considered for the Oil & Gas installations).

9.3 Earthing system of Instrumentation, Telecom and Lightning protection system shall be interconnected at required locations as per IEC 62305 and SPD shall be considered for this requirement as per the LPL-II & considered in the SOR & IFC.

9.4 The earthing system shall be designed as per latest revisions of applicable standards such as IS: 3043:2018, IEEE: 80.

9.5 The resistance value of Earthing system shall be less than 4 ohms for lightning protection system but in no case, it shall be more than 10 ohms and Grid resistance shall be limited to max 01 Ohm.

9.6 All equipment earthing to be carried out as per IS: 3043, minimum size of GI/Copper earth conductor to be used will be as given below.

Sl No.	Equipment	Minimum Earthing Conductor size.
1.	Utility building PDB, MLDB, Switch Socket DB, UPSDB, Lighting DB etc.	50 x 6 mm GI/16 sq. mm GI rope
2.	Switch Socket DB, Lighting DB, UPS DB	25 x 6 mm G.I. Strip
3.	FLP – WP lights/control station	6 sq mm solid GI Wire
4.	Product pipe line/ Bonding of Pipeline	25 sq mm insulated flexible copper wires cable (Green)

Sl No.	Equipment	Minimum Earthing Conductor size.
5.	Mechanical equipment / Vessels, Tanks, Pipe/cable racks, structure, fencing, Building Columns	50 x 6 mm GI Flat
6.	RTU, PLC, SCADA, Control Panel, Telecom, Metering Panel, UPS	25 x 3 mm Copper Strip
7.	Field Instruments	2.5 sq mm insulated flexible Cu wires cable (Green)
8.	Jumper for flanges	50 x 3 mm Copper Strip
9.	Battery Banks	16 sq.mm stranded GI wire
10.	Lightning Protection	Min 25x3 mm GI Strip or 8 mm dia round conductor
11.	Street Light Poles	Min 25x3 mm GI Strip or 10 mm (3/8") dia. GI Wire Rope
12.	Lighting Transformer (Mid-Point earthed)	25 x 6 mm G.I. Strip.
13.	Push Button stations	8SWG Solid GI wire.

9.7 Earthing Electrode will be GI pipe for electrical system & Copper plate for instrument/ SCADA & Telecom system.

9.8 An independent earthing pit shall be provided for lightning protection and this shall be bonded with the main earthing network below ground, minimum at two points only.

9.9 Body Earthing minimum 2 nos. for Transformer and Neutral earthing minimum 2 nos. of Transformer and Generator shall also be done as per IS 3043. Neutral Earth Pits shall not be connected to Electrical earth grid.

9.10 Minimum 2 Nos. Copper Plate Electrodes will be provided for RTU / Control Panel at each station.

9.11 Minimum 2 Nos. Copper Plate Electrodes will be provided for Telecommunication System at each station.

9.12 Advanced maintenance free earthing with carbon backfills are considered for earthing, which includes Cu bonded 17.2/25 mm as required.

9.13 Earth conductor shall be adequately sized to carry the applicable maximum earth fault current without undue temperature rise. All joints shall be protected against corrosion.

9.14 Lighting Fixtures shall be earthed through the extra core provided in the lighting cable.

10.0 CABLES

Power & Control cables will have the following specification:

10.1 **HT Power Cable (11 KV- UE)**

- XLPE insulation
- Inner sheath will be ST2
- Inner and outer sheath will be extruded.
- Steel strip / wire armoured.
- Outer sheath of cable will be FRLS PVC, ST2 type.
- Voltage grade – 11000 V (UE)
- Applicable standard: IS-7098 Part I & II.

10.2 **LT Power Cable (1.1 KV)**

- XLPE insulation
- Inner sheath will be ST2
- Inner and outer sheath will be extruded.
- Steel strip / wire armoured.
- Outer sheath of cable will be FRLSH PVC, ST2 type.
- Voltage grade – 1100 V
- Applicable standard: IS-7098 Part I & II.

10.3 **Control Cable (1.1kV grade)**

- Stranded Annealed Copper Conductor 2.5 sq mm
- XLPE insulation.
- Inner sheath will be ST2
- Steel strip/wire armored
- Outer sheath of cable will be FRLSH PVC, ST2 type.
- Voltage grade – 1100 V

- Applicable Standard: IS-7098 Part I.

10.4 **Lighting Cable / Wire in conduit**

- 1.5 mm^2 stranded Copper PVC insulated wire in concealed PVC conduit will be used in lighting fixtures.
- 3 core 2.5 mm^2 stranded copper cable (YWY) will be used for flameproof fixtures.
- 3 core 2.5 mm^2 stranded copper cable (YWY) will be used from outdoor lighting DB to junction box on the lighting poles.
- 3 core 2.5 mm^2 stranded copper cable (YWY) will be used from junction box on the lighting poles to lighting fixture.
- 4 core 2.5 mm2 stranded copper cable (YWY) will be used for lighting in shed area.
- 4mm2 stranded Copper PVC insulated wire in concealed PVC conduit for 5/15-amp switch socket, 20A Industrial switch socket.

CABLING SYSTEM

Cable laying philosophy

A. Paved area:	Cable tray/RCC trench
B. Unpaved area:	Directly buried with sand cushioning, brick covered and warning tape and cable marker.
C. Type of cable trays:	Galvanized prefabricated

11.0 SPLIT A.C. SYSTEM

11.1 All A.C. will be supplied power 230V, 50 Hz, 1 Ph & N and Control room temperature will be maintained 25˚ C±2˚C with 12 hrs external timer.

12.0 POWER CONNECTIVITY FROM SEB -TRANSFORMER AND ITS MOUNTING ON DOUBLE POLE STRUCTURE WITHIN DT/RT/IP / SV TERMINAL

Power connectivity from nearest available power source through Overhead Conductor/Cables (O/H or U/G) along with all requisite materials up to Double Pole structure near IGGL terminal/stations shall be executed by SEB on depositary basis by IGGL. All the payments towards works executed on depositary basis shall be paid by the Owner.

Supply, Installation, Testing & Commissioning works of Distribution Transformer & Double Pole structure at IGGL terminal/ station shall be executed by SEB on depositary basis by

IGGL. All the payments towards works executed on depositary basis shall be paid by the Owner.

Contractor shall carry out all the required lesioning with concerned authorities for the above-mentioned works including all works related to statutory approvals of the complete installation, from competent authority like CEA, DGMS, State electricity Authority/Board etc.

Note: Grid power supply to pipeline installations should be taken from dedicated/ industrial feeder of DISCOM. The transformer from grid at pipeline stations shall be installed outside the station preferably.

13.0 EQUIPMENT SPARE PHILOSOPHY & STANDARDIZATION OF MAKES

Electrical equipment shall be selected considering the spare availability for next 15 years and makes of components, equipment shall be considered in such manner that spare inventory shall be limited by considering the same/existing make of electrical equipment & components.

14.0 STATUTORY APPROVAL

The submission of application on behalf of the Owner to Govt. Authority/ Central Electricity Authority, if required along with copies of required certificates complete in all respects, shall be done by the contractor well ahead of time so that the actual commissioning of is not delayed for want of approval from authority. The actual inspection of work by the Govt. inspector shall be arranged by the Contractor and necessary coordination and liaison work in this respect shall be the responsibility of the contractor. However, any fee paid to the Govt. Authority in this regard shall be reimbursed by the Owner on submission of bills with documentary evidence.

The Inspection and acceptance of the work as above shall not absolve the Contractor from any of responsibilities under this contract.

15.0 DRWINGS AND DESIGN DOCUMENTS

15.1 The following documents shall be submitted along with the offer:

a) Filled up data sheet/Checklist.
b) HSE Policy
c) Bar Charts & Project completion schedule
d) QAP
e) List of two years operation and maintenance spare.
f) Approx. dimensions of the system

15.2 The following drawings (in three sets) & documents shall be submitted for approval within 3 weeks of award of contract.

a) Soil survey report with marked location vulnerable area.
b) Various Installation & Commissioning Procedures- Earthing, Lighting, PDB

Panels, LDB Panels, Outdoor & Indoor lighting, UPS, Battery Charger System, Battery Bank, Cable laying & termination etc.

c) QA & QC Procedures.

d) Various Data Sheets & Design for Approval- Lighting, PDB Panels, LDB Panels, Outdoor & Indoor lighting, UPS, Battery Charger System, Battery Bank, Cable's, wiring, earthing & lightning etc along with basis of system design and design calculations, equipment selection criteria and sizing calculations, formulae used

e) Equipment layout, Cable layout & schedule.

f) Colour code identification for the various cables/ wires used in the system.

g) G.A. of various electrical equipments.

h) Schematic diagrams of various equipments.

i) Wiring diagram for reference.

j) Tentative Bill of Material

15.3 After the job completion, contractor shall prepare AS-BUILT drawings/data sheets and documents, submit catalogues/manuals (O&M) of major brought out items. Final certified as built drawings, documents and manuals etc shall be submitted by the contractor to owner in bound volume with one set in soft copy (CD) plus five sets of prints to owner & one set to MECON.

Other drawings and documents shall be submitted by contractor/MECON along with AS-BUILT Drawings/Datasheets-

a) Test documents & drawings for bought out items.

b) Detailed commissioning report of each station.

c) As-built Earthing & lightning layout with commissioning report.

d) As-built lighting layout with lux level at each point.

e) Installation, Testing & commissioning documents.

f) Displaying of Hazardous area classification, Earthing layout drawings at SV/DT & RT

-X-X-X-

DATE -15.06.2026

CRITICAL & NON CRITICAL LOAD REQUIREMENT FOR DULIAJAN FEEDER LINE

S.No.	DISCRIPTION	Voltage	Terminals: D/T at CGGS MADHUBAN (Watt)	SV-01	SV-02	SV-03	D/T Source Lapetkheta	SV-04	SV-05	IP-01	SV-06	SV-07	SV-08	SV-09	R/T (SV-14 of GNPL) JORHAT-IGGL CONNECTIVITY (watt)	REMARKS
	A. CRITICAL LOAD DETAILS															
1	*TELECOM*	**(-)48V DC**	*800*	*550*	*550*	*550*	*650*	*550*	*550*	*700*	*550*	*550*	*550*	*550*		
2	*RTU*	**24V DC**	*200*	*150*	*150*	*150*	*150*	*150*	*150*	*200*	*150*	*150*	*150*	*150*		
3	*Telecom Servers and workstations*	**230V AC**	*1000*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*		
4	*SCADA and APPS*	**230V AC**	*1500*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*		
5	*INSTRUMENTATION (CONTROL PANEL)*	**24V DC**	*350*	*200*	*200*	*200*	*350*	*200*	*200*	*200*	*200*	*200*	*200*	*200*		
6	*PCP SYSTEM*	**48V DC**	*NA*	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*	*200*		
		230V AC	*200*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*		
7	*PIDS*	**Critical 230V AC**	*1600*	*N/A*	*N/A*	*N/A*	*650*	*N/A*	*N/A*	*700*	*N/A*	*N/A*	*N/A*	*N/A*		
8	*INSTRUMENTATION (METERING PANEL)*	**230V AC**	*1100*	*NA*	*NA*	*NA*	*800*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*		
9	*F A System*	**230V AC**	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*	*250*		
	TOTAL CONNECTED LOAD CRITICAL (Watts)		**7000**	**1350**	**1350**	**1350**	**3050**	**1350**	**1350**	**2250**	**1350**	**1350**	**1350**	**1350**	*Existing system shall be used*	
	TOTAL CONNECTED LOAD ON UPS		*7000*	*1350*	*1350*	*1350*	*3050*	*1350*	*1350*	*2250*	*1350*	*1350*	*1350*	*1350*		
	TOTAL CONNECTED LOAD ON CHARGER			*1350*	*1350*	*1350*	*3050*	*1350*	*1350*	*2250*	*1350*	*1350*	*1350*	*1350*		
	UPS CAPACITY		*8235.29*				*3588.24*			*2647.06*						
	UPS SYSTEM CAPACITY (VA)		**8235.294118**	------	------	------	**3588.24**	------	------	**2647.06**	------	------	------	------		
			10 KVA with 12 Hr back up*	------	------	------	**5 KVA with 3 Hr back up with SMF battery (Parta Cabin)**	------	------	**5 KVA with 6 Hr back up**	------	------	------	------		
	CHARGER/SOLAR SYSTEM CAPACITY (W)		------	**1350.00** Free issued 96V solar system with 48 Hr back up	**1350.00** Free issued 96V solar system with 48 Hr back up	**1350.00** Free issued 96V solar system with 48 Hr back up	------	**1350.00** Free issued 96V solar system with 48 Hr back up	**1350.00** Free issued 96V solar system with 48 Hr back up	------	**1350.00** Free issued 96V solar system with 48 Hr back up	**1350.00** Free issued 96V solar system with 48 Hr back up	**1350.00** Free issued 96V solar system with 48 Hr back up	**1350.00** Free issued 96V solar system with 48 Hr back up		
	B. NON - CRITICAL LOAD DETAILS															
	INDOOR LIGHTING		*2000*	*1500*	*1500*	*1500*	*1500*	*1500*	*1500*	*1500*	*1500*	*1500*	*1500*	*1500*		
	OUTDOOR LIGHTING		*2200*	*2200*	*2200*	*2200*	*2200*	*2200*	*2200*	*2200*	*2200*	*2200*	*2200*	*2200*		
	AC SYSTEM		*12000*	*4000*	*4000*	*4000*	*12000*	*4000*	*4000*	*4000*	*4000*	*4000*	*4000*	*4000*		
	INSTRUMENTATION/ TELCOM/ SCADA- AUX LOAD		*1000*	*1000*	*1000*	*1000*	*1000*	*1000*	*1000*	*1000*	*1000*	*1000*	*1000*	*1000*		
	TOTAL CONNECTED LOAD NON-CRITICAL (Watts)		**17200**	**8700**	**8700**	**8700**	**16700**	**8700**	**8700**	**8700**	**8700**	**8700**	**8700**	**8700**		
	CONSIDERING 1.20 DIVERSITY FACTOR		*14333.33*	*7250.00*	*7250.00*	*7250.00*	*13916.67*	*7250.00*	*7250.00*	*7250.00*	*7250.00*	*7250.00*	*7250.00*	*7250.00*		
	UPS CHARGER RATING (Watt)		**62000**	**19000**	**19000**	**19000**	**18500**	**19000**	**19000**	**32000**	**19000**	**19000**	**19000**	**19000**	*Existing system shall be used*	
	SOLAR GRID CHARGER RATING (Watt)		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*		
	CONSUMER MAXIMUM DEMAND (CMD) @ 0.8 POWER FACTOR (VA)		*95416.67*	*32812.50*	*32812.50*	*32812.50*	*40520.83*	*32812.50*	*32812.50*	*49062.50*	*32812.50*	*32812.50*	*32812.50*	*32812.50*		
	CONSUMER MAXIMUM DEMAND IN VA		**95416.67**	**32812.50**	**32812.50**	**32812.50**	**40520.83**	**32812.50**	**32812.50**	**49062.50**	**32812.50**	**32812.50**	**32812.50**	**32812.50**		
	CONTRACT LOAD FROM SEB (KVA)		**100 KVA**	**33 KVA**	**33 KVA**	**33 KVA**	**41 KVA**	**33 KVA**	**33 KVA**	**50 KVA**	**33 KVA**	**33 KVA**	**33 KVA**	**33 KVA**		
	DG Set rating		**NA**	**63 KVA**	**63 KVA**	**63 KVA**	**DG Supply from BCPL**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**		
	TRANSFORMER (11/0.433 kV) RATING SELECTED		**100 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**	**63 KVA**		

Concurrence

Note-1 * 12 Hrs battery backup for CGGS Madhuban, 6 hrs battery backup for IP-01 and 3Hrs battery backup for DT Lapetkheta has been consdiered as per discussion with IGGL and to reduce the DG size to 63 KVA	Name	Sign	PREPARED BY	CHECKED BY	APPROVED BY
Instrumentation section					
Telecon & SCADA			Pradipta Roul DM (Electrical)	Aashis Moyal AGM (Electrical)	Pankaj Srivastava Sr GM & SIC (E&I)

Project	NEGG-DFL	Doc No.- 05/E9/E/0085/Load List/Phase-1	
	Tender Purpose	Revision	0
		Date	15.06.2026
		Subject	Electrial Load List

INDRADHANUSH GAS GRID LIMITED

ELECTRICAL SCOPE OF WORK
FOR
DULIAJAN FEEDER LINE

DULIAJAN FEEDER LINE (FROM CGGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)

(ELECTRICAL SECTION)

MECON LIMITED DELHI

Document No.	Revision No.	Date
MEC/05/E9/E0079/E/SOW/0001	R-A	20.07.2026

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Rev	Issue Date	Prepared By:	Checked By:	Approved By:
A	20.07.2026	(Pradipta Ranjan Roul) Dy. Manager - Electrical	(Aashis Moyal) AGM- Electrical	(P.Srivastava) Sr.GM I/C- E&I

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1.0 GENERAL

Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, GAIL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. As per Hydrocarbon Vision 2030 for North East India, North East Gas Grid (NEGG), a natural gas pipeline network, is being set up to connect the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni Guwahati Gas Pipeline. The project is being implemented in three phases based on the requirement of statutory clearance, route terrain, linkage with Highway corridor widening works, difficulty in work execution etc. for the development of a gas-based economy in North-Eastern India.

As per the mandate of the Cabinet Committee on Economic Affairs (CCEA), the NEGG is to connect all the eight Northeastern states to the National Gas Grid for the development of a gas-based economy in the Northeast in line with the Hydrocarbon Vision 2030 for the Northeast. It is also mandated by the CCEA to connect all the regional gas sources of the Northeast for early monetization of natural resources and to boost Exploration & production (E&P) activities in the region.
The natural gas pipeline grid would have the facility for injection of indigenously produced gases also. Connectivity from local marginal fields as well as source line/spur lines into North-East Gas Grid has been considered. The upstream source/ pipeline operator would make necessary arrangements for availability of requisite pressure at source for gas injection into the grid, as per the hydraulics.

M/s IGGL has awarded M/s MECON Limited as project management consultancy (PMC) services for proposed 24"NB X 176.120 Kms. (appx.) cross-country pipeline from Dispatch Terminal at CGGS Madhuban of OIL to existing SV-14 of GNPL at Jorhat-IGGL connectivity along with associated facilities. The Scope also includes a proposed 24"NB X 6.100 Kms. (appx.) cross-country pipeline from Dispatch facility at BCPL Lepetkata Plant to receiving (cum injection point) at Jokai Lepetkata along with associated facilities. The total proposed pipeline length is 24" NB × 182.220 km (appx.). Salient features of the Project are as below:

Product: NG
Pipeline Size: 24"
Pipeline Coating -3LPE
Refer table-1 for details of pipeline under this package.

Pipeline	Location		Diameter/ Design pressure	Approx. Length (Km)
	From	To		
Duliajan Feeder line	DT at CGGS Madhuban Ch 0.00km (Existing DT)	RT at (SV-14 of GNPL at Jorhat-IGGL connectivity) Ch 174.236 km (Existing RT)	As per Process design basis	174.236 KM (Approx.)
Pipeline	Location		Diameter/	Approx.

	From	To	Design pressure	Length (Km)
Injection point for Lepetkata, Jokai to Source BCPL Lepetkata plant	DT at Source BCPL Lepetkata plant Ch 0.00km	Injection point for Lepetkata, Jokai Ch 46.830 km	As per Process design basis	6.027 KM (Approx.)

Table-1, Pipeline details

Scope under above referred Pipeline mainly consists of following:

This document indicates the broad scope of work for Electrical system. It indicates minimum requirements of Electrical system and equipment. In case of any conflict between the codes and standards listed, the same shall be brought to the notice of Owner for final decision, which shall be binding.

Definitions

OWNER	The party that initiates the projects and ultimately pays for its design and construction, Indradhanush Gas Grid Limited (IGGL)
PMC	The party which carries out all or part of the design, engineering, procurement, construction management and commissioning assistance, MECON Ltd
CONTRACTOR	The party shall mean any OWNER, firm or partnership other than the PMC CONSULTANT contracted to the OWNER to carry out the agreed work.

2.0 CODES AND STANDARDS

Electrical equipment and system design, manufacture, testing, installation and commissioning will comply with all the latest applicable standards, regulations and codes as mentioned below:

BIS	-	Bureau of Indian Standards
CMRI	-	Central Mines Research Institute
DGMS	-	Director General of Mines Safety
OISD	-	Oil Industrial Safety Directives
IEEE	-	Institute of Electrical & Electronics Engineer
IER	-	The Indian Electricity Rules, 1956
ANSI	-	American National Standards Institute
BEE	-	Bureau of Energy Efficiency, India
IEC	-	International Electro technical Commission

2.1 In case of imported equipment standards of the country of origin shall be applicable if these standards are equivalent or stringent than the applicable Indian standards.

2.2 The equipment shall also confirm to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.

2.3 In case of any contradiction between various referred standards/ specifications/ data sheet and statutory regulations the following order of priority shall govern. However, the stringent of the below shall be followed.

- Statutory Regulations.
- Data sheets.
- Scope of Work/ Job specification.
- Design Basis.
- Standard Specification.
- Codes and Standards.

3.0 OPERATING CONDITIONS AND POWER SUPPLY DATA

3.1 Operating Conditions:

The equipment offered and the installation shall be suitable for continuous operation under the following site conditions.

a)	Max. / Min Temperature	:	$50^0C/2^0C$
b)	Design Temperature for Electrical Equipments	:	55^0C
c)	Design Temperature for Batteries	:	2^0C to 50^0C
d)	Maximum Relative Humidity	:	95%
e)	Altitude	:	Less than 1000 m above MSL
f)	Atmospheric Condition	:	To withstand site conditions (Dry, dust storms during summer, Humid & Heavy Rainfall during Monsoon)
g)	Soil Resistivity	:	As per Soil Resistivity Report
h)	Seismic Zone	:	As per IS 1893
i)	Minimum load pf stipulated by	:	0.95

3.2 Power Supply Data:

i) For DT, RT, IP stations:

NORMAL POWER	415V (+10%/-15%), 3 phase, 50Hz (+/-3%), Solidly earthed (Fault level –30kA for 1 sec)
EMERGENCY POWER	415V (+10%/-15%), 3 phase, 50Hz (+/-3%), Solidly earthed from DG Set
ILLUMINATION SYSTEM: (i) NORMAL LIGHTING.	230 V(+/-10%) , 1 phase, 50Hz(+/-3%), Solidly earthed (Fault level –10kA for 1 sec) - 240V AC Normal Supply

(ii) EMERGENCY LIGHTING.	- 240V AC Inverter Supply for Indoor and outdoor EM lighting.
UPS	240V (+/-1%) & Frequency (+/-0.5%)
AC-DC CONVERTERS	48V and 24V (+/-1%)
INSTRUMENTATION	230 V AC, 1 Phase
(UPS)	24 V DC
TELECOM SYSTEM (UPS)	-48 V DC
SCADA (UPS)	24 V DC
CP SYSTEM (UPS)	48 V DC
FA & CO2 Flooding system	230V AC

ii) For all Solar Powered SV Stations:

NORMAL POWER	415V(+10%/-15%) , 3 phase, 50Hz(+/-3%), Solidly earthed (Fault level –30kA for 1 sec)
ILLUMINATION SYSTEM: (i) NORMAL LIGHTING. (ii) EMERGENCY LIGHTING. (iii) CRITICAL LIGHTING	230 V(+/-10%) , 1 phase, 50Hz(+/-3%), Solidly earthed (Fault level –10kA for 1 sec) -230V AC Normal Supply -230V AC Inverter Supply. - Self-Contained inbuilt Rechargeable Battery Backup
SOLAR	96V DC for SV Station
DC-AC CONVERTERS	230V AC
DC-DC CONVERTERS	48V and 24V (+/-1%)
INSTRUMENTATION	24 V DC
TELECOM SYSTEM	-48 V DC
SCADA	24 V DC
CP SYSTEM	48 V DC
FA & CO2 Flooding system	230V AC

3.3 GENERAL DESIGN CRITERIA

3.3.1 Hazardous Area Requirements

Instruments located in hazardous area shall be certified to meet or exceed the electrical hazardous area classification. In general, all field mounted instruments, electrical components shall be preferably certified as Ex'i'. Incase Ex'i' is not available, Ex'd' can be proposed suitable for Zone-1 and II Gr. IIA/IIB, T3 area.

All electrical and instrumentation Items shall be PESO certified irrespective of their installation in safe or hazardous area.

3.3.2 Ingress Protection

Individually supplied instruments including cable glands and blanking plugs shall have an environmental protection rating of IP 65 minimum. For indoor installation, environmental protection rating of IP 54 minimum shall be applicable. Also refer SOR.

3.3.3 Electromagnetic Compatibility

All electrical equipment shall comply with Electromagnetic Compatibility requirement specified in IEC 61000.

3.3.4 Quality Assurance

CONTRACTOR, SUPPLIER / VENDOR of equipment shall operate a Quality Assurance system. This system shall be based on the principles of ISO 9001 or equivalent. The quality system may be subject to auditing and monitoring by the OWNER or his representative.

3.3.5 Reliability and Maintenance

High reliability of instrumentation is of paramount importance and therefore only existing field proven instrumentation, which is readily available and used widely in similar applications, shall be considered. Selection of Instrumentation systems and equipment shall take account of the projects overall requirements for high availability. Importance shall be given to reducing the maintenance frequency and duration.

3.3.6 Special Tools

The SUPPLIER / VENDOR of the main equipment shall provide tools, and any other specialist items, required to operate and maintain any instrument or system.

3.3.7 Design Life

Vijaipur Dispatch Station, SVs and RT at Bina – BPCL of VBPL Project are located in Madhya Pradesh. The site condition shall be as per MR and data sheet. The design life of the equipment shall be 25 years.

3.3.8 Surge and Transient Protection

Surge / Transient protection to be provided for all electronic Instruments at both field & system end.

4.0 SCOPE OF WORK

The contractor's scope of work includes following:

All electrical works for following pipeline terminals is in scope of Contractor:

a. D/T at CGGS Madhuban
b. SV-01 (Remote operated)
c. SV-02 (Remote operated)
d. SV-03 (Remote operated)
e. D/T at Lapetkheta (Remote operated)
f. SV-04 (Remote operated)

g. SV-05 (Remote operated)
h. IP-01 (Remote operated)
i. SV-06 (Remote operated)
j. SV-07 (Remote operated)
k. SV-08 (Remote operated)
l. SV-09 (Remote operated)
m. R/T at (SV-14 of GNPL JORHAT-IGGL Connectivity)

4.1 SCOPE OF DESIGN & ENGINEERING

4.1.1 Submission of electrical equipment design calculations (Lighting, Cable Routing, Earthing & Lightning, PDB, LDB etc), complete SLD with control scheme, HVAC Calculations (if any), detail engineering, various drawings/layouts for review and approval, preparation of cable schedules, BOM, preparation of site engineering drawings and details for installation works wherever applicable or required by the Engineer-in-charge, and submits to the Engineer-in-charge for review.

4.1.2 Correction, updating and submission of all Owners' drawings for as-built status.

4.1.3 Providing and co-ordinating detailed design of all equipment and components within the scope of supply.

4.1.4 Obtaining clearance for energizing the complete electrical facilities covered under this tender and approval of installation and drawings from the Chief Electrical Inspector of the State Government/Central Electricity Authority and other statutory authority as required. This includes equipment's installed or commissioned by others within the battery limit. This is for the purpose of obtaining a comprehensive approval in one go.

4.2 SCOPE OF SUPPLY

This document covers the minimum requirements for the design, manufacturing, procurement of materials and bought out components, assembly at shop, inspection, testing, supply, packing, shipment and delivery to site for **Dispatch Terminal, SV Stations, IP station and RT Terminal of DFL Feeder Line.** Any items not listed in this document, but considered necessary for safe and smooth operation of the equipment shall be provided by the Vendor.

The scope of supply shall be in accordance with the latest revision of Data sheets, Specifications along with documents specified herein and applicable codes and standards.

Following electrical equipment and material are in the contractor's scope of supply in this tender.

4.2.1 Cables between transformer LT terminals of transformer & Outdoor MCCB Box, cable supports, double compression cable glands, lugs etc. as required.

4.2.2 Supply of 250 A TPN, AC-23 duty MCCB in outdoor type dust & weather proof steel enclosure.

4.2.3 Automatic Voltage Regulator (AVR) along with suitable rating (250A) of Incomer Voltage Range 320V to 490V with MCCB and outgoing Voltage 433V, +/- 3% with metallic enclosure (IP-52) & MCCB, including two no's Change Over switch (COS).

4.2.4 415V,0.8PF,58.5KVA Silent DG set (CPCB IV+) continuous rated and continues duty including exciter, AVR, Generator control and monitoring panel, PLC based AMF panel with FP MCCB.

4.2.5 415V, 30 KA Single Front Indoor LT Switchboards/ Panels (PDB) to receive and distribute power for all stations, LDBs (I/E LDB, PPLDB, OLDB etc.) as per SLD no. MEC/05/E9/E-0085/SLD.

4.2.6 10 KVA Dual Redundant Industrial UPS system with 12 Hr backup, Rectifier, NI-Cd Battery Bank, ACDB / DCDB & interconnecting cables for D/T at CGGS Madhuban as per SOR/TS. Contractor scope of work also includes incoming cables for UPS & all outgoing cables & cabling work from various ACDB & DCDBs.

4.2.7 5 KVA Dual redundant Industrial UPS system with 6 Hr backup, Rectifier, NI-Cd Battery Bank, ACDB / DCDB & interconnecting cables for IP as per SOR/TS. Contractor scope of work also includes incoming cables for UPS & all outgoing cables & cabling work from various ACDB & DCDBs.

4.2.8 5 KVA UPS system with 3 Hr backup (single phase converter) with Auto healthy phase selector module, Rectifier, SMF-VRLA Battery Bank, ACDB / DCDB & interconnecting cables for DT Lapetkheta as per SOR/TS. Contractor scope of work also includes incoming cables for UPS & all outgoing cables & cabling work from various ACDB & DCDBs.

4.2.9 Hybrid 1400W (For SV Stations) solar system with 72Hrs backup, 3 Ph 415V grid Charger & associated Solar Array/Panels, Anodised Al/Hot dip galvanized MS mounting structure, Junction boxes, Charge controller, DCDB, Battery bank, DC-DC converter, DC-AC Inverter, ACDB, interconnecting cables among - arrays, charge controller, DC-DC Converter, DCDB, Battery bank, 3Ph charger, DC-AC Inverter, ACDB etc as per enclosed SOR, PJS (Solar system) and specification.

4.2.10 Transportation of Solar system from different stores of IGGL (Jalpaiguri/Shillong/CWC-Agartala/Dispur) to all SV station after completion of civil building. Refer Annexure-III for details of material along with stored location.

4.2.11 MV power and control cable (XLPE – insulated armoured Al/Cu conductor 1/2/3/3.5/4 core cables).

4.2.12 FLP (CMRI, PESO approved) type double-compression nickel-plated brass cable glands, tinned-copper lugs, clamping material etc. for cable termination.

4.2.13 63 Amp Flameproof type welding receptacles etc.

4.2.14 A standalone dusk-dawn solar photovoltaic street lighting system for outdoor emergency lighting at various stations as per enclosed SOR.

4.2.15 FLP/Non-FLP Outdoor lighting fixtures complete with mounting bracket, control gear box as per the type of fixture, lamps etc. including civil work with pipe inserts for cables and connecting work, with all material and labour.

4.2.16 Supply of High Mast Lighting system on 20m high pole consisting for 8 nos. of lighting fixtures (120W LED Lamp) for DT/RT.

4.2.17 Electric illuminated station detail board along with mounting structure.

4.2.18 Illumination system, including lighting fixtures, lighting and power panels, switches, sockets, wiring, PVC conduit to be laid in the concrete slab / other civil construction etc. in safe and hazardous area. Piano reed type sockets complete with MDF Board & 10 pair cable etc. for indoor Telephones.

4.2.19 Inverter for emergency lighting for indoor and outdoor lighting.

4.2.20 1.8 T, 5 star Split Air Conditioners with stabilizer.

4.2.21 GI pipes, GI Cable-trays and accessories, cable markers, identifier tags, GI saddles and all other associated accessories for cable-laying.

4.2.22 Earthing and lightning protection system, including earthing pits, earth electrodes, earthing strips, grounding conductor of various sizes, Cu strip for flange jumper and Cu earth plates etc.

4.2.23 Safety equipment in the stations/terminals, like shock treatment charts, caution boards, first aid equipment, rubber mats, portable fire extinguishers, sand bucket etc.

4.2.24 Fabrication and supply of MS frames, supports, canopies and brackets for miscellaneous electrical equipments, including welding, supply of bolts, nuts etc for mounting and other necessary supplies, all inclusive of painting as specified.

4.2.25 Cable gland plate of suitable size & of min 3mm thickness shall be provided for cable termination, wherever required, for all the electrical panels (PDB/LDB/OLDB/UPS etc)

4.2.26 CO-ORDINATION WITH OTHER CONTRACTORS

Contractor shall be entirely responsible for Co-ordination with other contractors of & it should be ensured that the terminal work should be timely executed.

If the contractor fails to timely execution of the terminal work, necessary penalty clause shall be applied as per the direction of the Engineer-in-Charge.

4.2.27 All works relating to statutory approvals of the complete installation, from competent authority like CEA, DGMS, State electricity authority/Board etc, shall be in the scope of contractor

Note: SLDs (. MEC/05/E9/E-0085/SLD) attached with tender documents are for tender purpose only. Detailed SLD shall be furnished by the bidder as per the requirements of the system. Any

change, Modifications, Addition/deletion occurs later due to system requirements shall deem to be inclusive in the price quoted by the bidder, No extra cost shall be paid for the same.

4.3 SCOPE OF INSTALLATION, TESTING & COMMISSIONING

Electrical Contractor shall be responsible for installation and commissioning & testing of free issue items as per the site requirement, overall checking and final charging of the system.

The Contractor shall provide qualified and experienced supervision personnel for the supervision of installation, site testing, pre- commissioning, commissioning and hook up.

The Contractor shall out line details of training requirement applicable for safe and correct installation assembly, commissioning and operation of items. The supplier's specialist deputed for pre-commissioning and commissioning of the equipment shall prepare training modules and conduct training with company personnel at supplier's work or at site.

4.3.1 Installation, testing & commissioning of Cables between transformer, LT terminals of transformer &MCCB Box, cable supports, double compression cable glands, lugs etc as required.

4.3.2 Installation, testing & commissioning of 250 A TPN, AC-23 duty MCCB in outdoor type dust & weather proof steel enclosure.

4.3.3 415V,0.8PF,58.5KVA Silent DG set (CPCB IV+) continuous rated and continues duty including exciter, AVR, Generator control and monitoring panel, PLC based AMF panel with FP MCCB.

4.3.4 Installation, testing & commissioning of Automatic Voltage Regulator (AVR) along with suitable rating (400/250A) of Incomer Voltage Range 320V to 490V with MCCB and outgoing Voltage 433V, +/- 3% with metallic enclosure (IP-52) & MCCB, including two nos Change Over switch (COS).

4.3.5 Installation testing & commissioning of 415 V switch boards/PDBs/MLDBs/LDBs.

4.3.6 Installation testing & commissioning of Dual Redundant 10KVA UPS system (at DT CGGS Madhuban) & Dual redundant 5KVA UPS System (at IP station), 5KVA UPS System (single phase converter with AHPS module (at DT Lapetkheta), Battery Bank, ACDB / DCDB & interconnecting cables this also includes battery capacity test at site including arrangement of DG set of required capacity and fuel.

4.3.7 Installation, testing and commissioning of Hybrid 1400W (For SV Station) solar system with 3 Ph 415V grid Charger & associated Solar Array/Panels, Anodised Al/Hot dip galvanized MS mounting structure, Junction boxes, Charge controller, DCDB, Battery bank, DC-DC converter, DC-AC Inverter, ACDB, interconnecting cables among - arrays, charge controller, DC-DC Converter, DCDB, Battery bank, 3Ph charger, DC-AC Inverter, ACDB etc as per enclosed SOR, PJS (Solar system) and specification at all SV's location. This also includes battery capacity test at site including arrangement of DG set of required capacity and fuel.

4.3.8 Laying & termination of all MV/LV power and control cables laid in concrete-lined trenches, buried cable trenches, pipes, road crossings, pipe-racks etc.

4.3.9 Installation, testing and commissioning of standalone dusk-dawn solar photovoltaic street lighting system for outdoor emergency lighting in scope of Solar street light contractor/vendor & shall be as per enclosed SOR.

4.3.10 Installation, testing & commissioning of High Mast Lighting system on 20m high pole consisting for 8 nos. of lighting fixtures (120W LED Lamp).

4.3.11 Installation, testing and commissioning of lighting system in buildings.

4.3.12 Installation testing & commissioning of Inverter for emergency power.

4.3.13 Installation, testing and commissioning of outdoor street lighting system & lighting system for process area.

4.3.14 Installation testing & commissioning of Electric illuminated station detail board

4.3.15 Installation, testing & commissioning of earthing system & complete lightning protection system.

4.3.16 Installation, testing and commissioning of the contractor supplied materials.

4.3.17 All works relating to statutory approvals of the complete installation, from competent authority like CEA, DGMS, State electricity authority/Board etc, shall be in the scope of contractor

4.4 OTHER MISCELLANEOUS WORKS

4.4.1 Preparation of buried cable trenches, including, back filling, compacting providing of brick protection by second-class bricks, spreading of fine river sand, including all supplies.

4.4.2 The job includes repairing of all civil works damaged during installation of electrical facilities.

4.4.3 The scope of work under this contract shall be inclusive of breaking of walls, floors and chipping of concrete foundations necessary for the installation of equipment, materials, and making good of the same.

4.4.4 Minor modifications wherever required to be done in the owner free supplied equipment / devices to enable cable entry, termination, etc.

4.4.5 Sealing of opening made in the walls / floors for cables trays, cables, bus ducts, etc using acceptable practice and standards.

4.4.6 Supply and installation of all other accessories not specifically mentioned herein, but never the less necessary for completion of the job.

This shall include, but not be limited to: -

- Preparation of buried cable trenches, including, back filling, compacting providing of brick protection by second-class bricks, spreading of fine river sand, including all supplies.

- The job includes repairing of all civil works damaged during installation of electrical facilities.
- The scope of work under this contract shall be inclusive of breaking of walls, floors and chipping of concrete foundations necessary for the installation of equipment, materials, and making good of the same.
- Ensuring that all equipment supplied shall meet the requirements of the data sheets, specifications, design codes and engineering standards referred.
- Providing expediting services for the subcontracted items.
- Co-ordination for 3rd party inspection agency during shop inspection.

4.5 SPARE PARTS

4.5.1 Mandatory Spares:

The following is the minimum mandatory spares requirement. If any other spare parts other than the below mentioned are required for successful operation shall be listed by Vendor and quote separately.

1	Cable Drum Jack	01 No.	1 Lot
2	Hand Crimping Tool 300 sq.mm	01 No.	
3	Crimping Plier 25 mm	02 Nos.	
4	Electric Blower	01 No.	
5	Blow Lamps	04 No.	
6	Electrician Hand Tool Kit	01 No.	
7	Lineman Hand Tool Kit	01 No.	
8	Wireman Hand Tool Kit	01 No.	
9	Cable Jointer Tool Kit	01 No.	
10	Pistol Drilling Machines 6 mm	01 No.	
11	Concrete Drill Machines 6 mm	01 No.	
12	Dynamo Meter 10 T	01 No.	
13	Turn Buckles 5 T	01 No.	
14	Insulation Tester 500/1000 v / 2000 v	01 No.	
15	Earth Tester	01 No.	
16	Clip-On-Meter Analog and Digital	01 No.	
17	Multi Meter	01 No.	
18	Phase Rotation Tester	01 No.	

4.5.2 Spare Parts for Start-up and Commissioning:

Supply of erection, start-up/ commissioning spare parts which shall be included in the base price. The supplier shall submit the complete list of spares with the tender.

4.5.3 Recommended Spares for 2 years operation:

Supply of recommended 2 years operational spares. The supplier shall submit the details and item wise price list of recommended 2 years operational spares with the tender. The supplier shall quote the separate price per each item for the same.

4.5.4 Special Tools:

The Vendor shall also supply any special tools, which are required for the installation, operation and maintenance of the equipment being supplied. A list of special tools shall be provided. As a minimum, the following electrical maintenance / testing / calibration equipment to be supplied along with test certificates traceable to national / international standards. Also refer list of Tool Kits and Instruments (Annexure – A).

5.0 WARRANTY

The warranty period for the Solar System etc supplied and terms shall be as specified in the Purchase Order. The warranty services shall be included as part of the base quote only. No extra cost shall be claimed for warranty services.

6.0 AREA CLASSIFICATION

Hydrocarbon handling areas have been generally classified as zone 1 & 2, gas group IIA/IIB as per IS: 5572, API RP-500, OISD - 113 and IP Rules. All equipment to be installed in these areas shall be suitable for the area classification with temperature class T3 (200^0C), CMRI testing and approved by CCOE, DGFAS and having BIS license.

7.0 JOB SPECIFICAITONS

Various electrical works covered under this contract like equipment erection, cabling, lighting and grounding works, etc. shall be performed in accordance with specifications attached with this tender. (Certain clauses of specifications, which are applicable to equipment or system not covered under this contract, shall not be applicable).

Erection and commissioning of certain special equipment shall be performed in accordance with supplier's instructions and directions of the Engineer-in-charges under supervision by equipment supplier/s.

The equipment/materials to be supplied by the contractor shall conform to the requirements of the applicable specifications enclosed in the tender document.

8.0 STATUTORY APPROVAL OF WORKS

All works relating to statutory approvals of the complete installation, from competent authority like CEA, DGMS, State electricity Authority/Board etc, shall be in the scope of contractor.

The application on behalf of the owner for submission to Electrical Inspector / DGMS etc. along with copies of required certificates and drawings, complete in all respects, shall be prepared by the contractor and submitted to the Engineer-in-charge for onward transmission well ahead of time so that the actual commissioning of equipment are not delayed for want of inspection by the Electrical Inspector / DGMS. The actual Liaison work shall be arranged by the Contractor and necessary coordination and liaisons work in this respect shall be responsibility of the contractors. However, the Owner on submission of bills along with documentary evidence shall reimburse any fee paid to the statutory Authority in this regards.

9.0 MAKES OF EQUIPMENTS AND MATERIALS

All equipment / materials supplied by the contractor shall be as per the list of approved makes enclosed with this document subject to submission of Certification and approvals.

10.0 INSPECTION, TESTING & COMMISSIONING

a. All the equipment supplied and installed by the contractor shall be tested and commissioned as required and no separate payments shall be made for the same. Any damage or defect noticed shall be brought to the notice of the engineer- in-charge and will be rectified without any delay and no payments shall be made for rectification.

b. Any work not conforming to the execution drawings, specifications or codes shall be rejected forthwith and the contractor shall carry out the rectification at his own cost.

c. The contractor shall carry out all the tests as enumerated in the technical specifications and as per applicable codes and standards.

d. Before the electrical system is made live, the electrical contractor shall carry out suitable tests to establish to the satisfaction of engineer-in-charge that the installation of equipments, wiring and connections have been correctly done and are in good working condition and that it will operate as intended.

e. All the tests shall be conducted in the presence of Owner/ Engineer-in/charge or his authorized representative unless he waives this requirement in writing. The contractor shall arrange all testing equipment necessary to carry out the test. The tests shall be recorded on approved Performa and certified records of the tests shall be submitted to Owner/ Engineer-in-charge.

f. After the completion of all tests and rectification of all defects pointed out during final inspection, plant start-up trials would be commenced. During the start-up trials contractor shall provide skilled / unskilled personnel and supervision round the clock at his cost. The number and category of workmen and duration up to which required, will be decided by the Engineer-in-charge. Any defects noticed during the start-up trial relating to the equipment supplied and work carried out by the Contractor, will be rectified by the contractor at his own cost.

g. Engineer-in- charge shall have the right to get these defects rectified at the risk and cost of the contractor if he fails to attend to these defects immediately as desired.

h. After the operating conditions are fully achieved in the plant and the other requirements as stated in the General Conditions of Contract are fulfilled, the contractor would be eligible for applying for a completion certificate.

11.0 DRAWINGS, STANDARD SPECIFICATIONS AND INSTALLATION STANDARDS

11.1 The equipment / materials to be supplied by the contractor shall conform to the requirements of the applicable specifications. Also the installation of various material / equipment shall conform to the installation standards /norms.

11.2 The drawings accompanying the tender documents when read with specification shall depict the electrical system of the Terminal. These are indicative of the nature of work and issued for

tendering purposes only. Purpose of these drawings is to enable the tendered to make an offer in line with the requirements of the Owner. Construction shall be as per drawings / specifications issued / approved by the Engineer-in-charge during the course of execution of work.

11.3 Conduit layout drawing in ceiling, wherever required, to be prepared by the contractor and shall be submitted for approval.

11.4 After the job completion, contractor shall prepare AS-BUILT drawings and documents, submit catalogues/manuals (O&M) of major brought out items like UPS, Inverter, Lighting fixture etc. Final certified as built drawings, documents and manuals etc shall be submitted by the contractor to owner in bound volume with one set in soft copy (CD) plus five sets of prints.

11.5 VENDOR DOCUMENTATION

All documents shall be in ENGLISH language an in M.K.S. System of units.

Unless otherwise agreed submission of drawings and documents for approval / records shall commence within 4 weeks from the date of purchase order.

The drawing and document shall be checked, approved and duly signed / stamped by vendor before submission. Revision Number shall be changed during submission of the revised Vendor documents and all revisions shall be highlighted clouds. Before submitting any sub-vendor drawings for review, the vendor shall ensure that these sub-vendor drawings have been reviewed, commented and stamped by the vendor. Direct submission of sub-vendor's drawings without vendor's review shall not be entertained.

While resubmitting the drawings and documents, the vendor shall, in a covering letter, specifically confirm whether all the comments have been incorporated, if not, shall furnish reasons with justification.

The Vendor shall furnish the project drawings and documents with bid and after award as per Vendor Data Requirement List clause mentioned elsewhere.

No manufacturing work shall proceed until the relevant drawings / documents have been approved or written "Consent to Proceed" has been obtained from Purchaser.

The Vendor shall issue certified copies of all final drawings / documents which requires Purchaser approval. Such drawings / documents shall have been incorporated with all comments made by the Purchaser and / or his appointed representative.

The Vendor shall make no modification / alteration to design, material etc as indicated on the approved drawings / documents without prior consent from the Purchaser and / or his appointed representative.

Vendor shall submit a list clearly describing all desired deviations from any part of this material requisition along with the bid A list shall be retained of all agreed exceptions and deviations for the duration of the purchase order, updated in the event of further concessions being granted and included in the data sheets. In the absence of this list with the submitted bid, it will be assumed that the Vendor will fully comply with all the requirements stated in this material requisition.

Vendor shall evaluate all his Sub-vendors offers and submit only one consolidated offer. The consolidated offer shall consist of one sub-vendor offered data per item which is fully or most technically compliant along with deviations (if any) in deviation list. Direct submission of multiple Sub-vendors offers and deviations shall not be accepted and Vendor's offer will be liable for rejection.

VENDOR DATA REQUIREMENT LIST (as applicable)

- Schedule of Vendor Documents.
- Technical Data Sheets (Duly Filled-In)
- Dimensional / Assembly Drawings
  - -GA Drawings (Elevation and Plan) including clearance requirements
  - -Installation Plans including foundation, cutout and mounting details
  - - Cross Sectional Views
  - - Cubicle Arrangement Drawings
  - - Component Drawings
  - - Name Plate Drawings
  - - Cable Termination Arrangement Drawings
- Electrical Wiring Drawings
  - - Single Line Diagrams
  - - Schematic Diagrams
  - - Wiring Diagrams and Terminal Details
  - - Interpanel Wiring Diagrams
- Bill Of Materials
- Calculations
- Auxiliary Power Requirement Data (AC & DC)
- QA Plan Of Vendor
- Inspection Plan And Testing Procedure (For review by inspection)
- Test Records
- Type Test Certificates
- List of Commissioning Spares
- List of Maintenance Spares
- List Of Special Tools & Tackles
- Data Book /Manual
  - - Installation Manual
  - - Operating / Maintenance manual
  - -. Catalogues / Brochures
- Equipment storage procedure at site
- Packing and shipping list

Notes:

1. Unless otherwise agreed, the number of copies of various drawings and documents shall be as below:
   a. Post order submission - For Review/ Records- Two copies

   b. Final Documents - Six prints and one electronic file in the form of Hard Disc.

2. Vendor shall note that GA drawings as furnished shall have adequate information for carrying out detail engineering at purchaser's end and as a minimum, shall include equipment dimensions, weights, clearances, connection details, fixing details, framing details and foundation / cutout details etc. of all equipment within scope of supply and further it must be ensured that these details are adhered.
3. Vendor shall furnish schedule of drawings and documents within 15 days after placement of purchase order.
4. Final Drawings/ Documents consisting of Technical Data Manual / Catalogue is a compilation of "as built" certified, drawings and data, manufacturing and test records, installation, operating and maintenance instructions. For drawings where Purchaser's approval was required, the final certified drawings shall be included, Final Documents shall be legible photocopies in A4, A3 or A2 size only. The Purchase Requisition shall also form a part of the final documentation

12.0 DEVIATION LIST

Non-Compliance to the requirements specified in the requisition, datasheets, and specifications or in any of the applicable codes / standards (including Project / Consultant / international standards) shall be considered as a 'Deviation'.

In case deviations to tender terms/conditions are unavoidable, the same should be mentioned in ONLINE DEVIATION SHEET. Deviations mentioned elsewhere shall not be considered by Purchaser/Consultant. Deviations, if any, shall be supported with appropriate justification for the Consultant's/ Purchaser's review / approval.

In case of no deviations on the MR, the Vendor shall write "NIL deviations" on the ONLINE DEVIATION SHEET and shall be submitted along with the bid. In the absence of such a statement with the bid, the total compliance to bid documents will be assumed.

Without the submission of properly completed "ONLINE DEVIATION SHEET" along with the offer, the Vendor's offer may be considered as incomplete and may be subjected to rejection at the sole discretion of the Consultant / Purchaser.

Deviations listed elsewhere in the proposal (i.e. other than ONLINE DEVIATION SHEET) shall be considered as invalid and deemed withdrawn by the Vendor & not considered for evaluation.

12.1 Contractor shall be the single point responsible vendor for all electrical equipment's like UPS, AVR, DG set, Solar system, LT panels, Transformer, Inverter, Lighting fixtures etc.

13.0 PACKAGING AND DESPATCH

The Vendor shall be responsible for preparation for shipment including packing, protection, preservation, labelling and marking of all items.

Load test certificates shall be shipped with all lifting equipment, spreader bars, slings and shackles. One copy of the installation and operations manual (if applicable) shall be shipped along with each equipment.

The equipment shall be securely packed for shipment from Vendor's location to the actual equipment destination. All items must be protected from handling damage either by protective packing with cartons, crates, etc. or by securing to pallets.

All materials must be packed in a way that handling with forklift truck or crane is possible. If there is a risk of damage to equipment and other appurtenances during transportation, they shall be disassembled and tagged. All components shall then be securely packed as above.

Equipment shall be adequately packed to withstand at least 12 months storage at construction site prior to installation. The Vendor shall recommend any necessary procedures to be imposed during storage.

Spare Parts and Special Tools shall be packed separately and clearly marked "Spare Parts" and "Special Tools" respectively.

Weights (in kg) and ''Centre of Gravity'' diagrams should be marked for each package and clearly identified on all packages.

All equipment shall be thoroughly cleaned internally and packaged free of loose foreign materials. Vendor shall replace all parts which have defects due to loose debris left from fabrication / shop tests of his own cost.

All surfaces not painted with the prescribed painting system shall be coated with corrosion protective grease for transportation and 12 months storage.

All openings shall be covered or capped to protect the inside from dust, rust and moisture. Flanged openings shall be provided with gasket metal closures securely fastened with bolts or clamps.

The Vendor shall attach a packing list, in a waterproof enclosure, to the outside of the package. In addition to any specific requirements identified via the documentation referenced within the material requisition, the packing list shall clearly show as a minimum;

Purchaser's Name:
Address:
Project name:
Name and Address of Vendor
Purchaser's Purchase Order number:
Purchase Order item number:
Partial or complete delivery for each order number:
Description of Contents:
Number of packages:

The Vendor shall also provide a list, within the packing list, showing all rust preventatives used. The rust preventatives list shall give instructions for removal of preventatives where required, and also necessary procedures to be imposed during storage.

Vendor shall provide a Delivery Specification, which shall describe all loose items furnished in a completely or not completely assembled condition. Delivery Specification must clearly indicate Purchaser's order number and item number for each loose item shipped by the Vendor.

One copy of the delivery specification shall follow the goods, one copy to be sent to the receiving port and one copy to be sent to the Purchaser.

14.0 TECHNICAL CRITERIA FOR ACCEPTANCE (ELECTRICAL) OF ELECTRICAL CONTRACTOR

(i) Copy of Electrical Contractor's license – **Grade A** from Electrical Licensing Board for 11kV or above enclosed**.**

(ii) Credential of Electrical Contractor which shows completion of OH 11KV line, Transformer, PDB , UPS, lighting, earthing etc executed during last three years.

(iii) The Main/Electrical Contractor shall be the single point responsible vendor for all electrical equipment like MV Switchboard, UPS, Solar etc.

-X-X-X-

TO BE FILLED-UP BY TENDERER

Sl. No.	Description	Remarks
1.	No deviation from the Electrical Specification/ SOR	
2.	Unpriced schedule of rate (SOR) enclosed.	
3.	List of similar electrical job undertaken during last three years has been enclosed with the offer.	
4.	List of electrical personnel employed, with their qualification & experience, has been enclosed with the offer.	
5.	Credential of electrical sub-contractor, enclosed with the offer.	
6.	Photocopy of Electrical Contractor's license – grade A has been enclosed with the offer.	

ANNEXURE-A

LIST OF TOOLS KITS AND INSTRUMENTS

S. No.	ELECTRICAL INSTRUMENTS	Qty.
1	500 V Hand Driven Insulation Resistance tester (Make-Fluke, Megger, Motwane, Meco or equivalent)	01 No.
2	Earth Tester Kit, complete with electrodes and connector (Make-Fluke, Megger, Motwane, Waco)	01 No.
3	Digital Tong Tester for A.C. & D.C. current measurement (Make-Rishabh, Fluke, Matwane or equivalent)	01 Nos.
4	Digital Multimeter (Make-Rishabh, Fluke, Motwane or equivalent)	01Nos.
4	Hand Drill Machine (Make-Bosch or equivalent)	01 No.
5	Fuse Puller	01Nos.
6	Manual Crimping Tool with accessories for cable size up to 185 mm ^{2}	01 No.

One no. of tool box to be provided at each control room building at new proposed SV stations Control room building. Tool box should contain at least the following tools.

A) Slides wrench -2 Nos. (12" & 8")

B) Ring Spanner-1Set

C) DE Spanner-1Set

D) Pipe wrench-1Set (14")

E) Screw Driver-1Set

F) Electrician screw driver-1 Set

G) Millimeter -1No

H) Allen Key - 1Set

I) Drilling machine (600 Watt) with multipurpose toolkit-1Set

J) Electric Extension Board. (Make-Anchor or equivalent) -1 No.

-

INDRADHANUSH GAS GRID LIMITED

PARTICULAR JOB SPECIFICATION
FOR
SPV POWER SUPPLY SYSTEM

DULIAJAN FEEDER LINE (FROM CGGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)

(ELECTRICAL SECTION)
MECON LIMITED
DELHI 110 092

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Rev. No.	Date	Prepared By	Checked By	Approved By
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1.0 GENERAL

Introduction

The intent of this specification is to define the requirements of SPV solar power supply system and the associated battery sets, charge controller, solar street lighting system, Grid charger, DCDB etc for Off-grid system. Tenderer's scope of work includes design, manufacture, testing, packing, delivery to site, installation, earthing, testing & commissioning of the complete Solar system with solar array, charge controller, battery banks, 415V 3Ph Charger for charging battery bank from grid supply/DG supply, Distribution boards, interconnecting cables etc as per enclosed specification, data sheets and SOR.

1.1 Standards

1.1.1 The equipment/material shall be in conformity with standard specifications, data sheet and code of practices of the relevant Bureau of India Standards & IEC. In case of any conflict, the stipulations under this specification/data sheet shall govern.

1.2 Site Conditions

The equipment offered and the installation shall be suitable for continuous operation under the following site conditions.

Max. / Min Ambient Temperature	:	50ºC/20ºC
Design Temperature for Electrical Equipments	:	50ºC
Max. Relative humidity	:	90 %
Altitude	:	less than 1000 m above MSL
Atmosphere	:	Hydrocarbon handling Industrial atmosphere

1.3 Power Supply Parameters:

1	INSTRUMENTATION	24 V DC, 230V AC
2	TELECOM SYSTEM	- 48 V DC (Conversion by others)
3	SCADA	24 V DC
4	PCP SYSTEM	48 V DC
5	FA & CO_2 Flooding system	230V AC

2.0 SCOPE

2.1 SCOPE OF SURVEY, DESIGN & ENGINEERING

2.1.1 Submission of solar array sizing calculations, MPPT charge controller size calculations, battery size calculations and 415V 3 Ph charger size calculation for approval Preparation of site engineering drawings and details for installation works wherever applicable or required by the Engineer-in-charge, and submits to the Engineer-in-charge for review.

The system shall be designed on the daily Ah requirement considering the max. 30 day cycle i.e. three No SUN DAYS in four weeks, However this cycle depends upon the Geo Graphical location of the installation & may go below the above consideration. The excess Ah shall be determined accordingly apart from the daily Ah requirement.

The Bidder shall survey the particular locations & accordingly determine the geo graphical data required for the installation of solar system & its design (i.e Avg. /High/Low Insolation throughout year, wind velocity Avg. /High/Low throughout year, Solar Radiation Avg. /High/Low throughout year (Radiation data of each month from 9AM to 5 PM of each location), sun path diagram etc as required for designing & installation of the PV system.

The result of the survey shall be presented in the graphical format & accordingly the optimised tilt angle for the installation PV system shall be calculated of each location for max power output through out the year.

The required nos. of array shall be calculated from the max. Current requirement by the battery bank during charging & the nos. of series modules shall be calculated as per the boost voltage of the battery bank.

All solar calculations shall be done on PVsyst 6 software and Bidder shall have valid licence of the software for the same at the time of Bidding. Bidder shall submit all the reports as per the software simulations.

2.1.2 The photovoltaic solar array, charge controller shall be sized to meet through battery back-up, load cycle requirement of connected load with availability of solar energy. However the rating of solar system shall not be less than as specified in SOR/MR.

2.1.3 Correction, updating and submission of all Owner's drawings for as-built status.

2.2 SCOPE OF SUPPLY

Following electrical equipment and material are in the contractor's scope of supply in this tender.

2.2.1 Solar Array/Panels, Anodised Al/Hot dip galvanized MS mounting structure, Junction boxes, Charge controller, DCDB, Battery bank, DC-DC converter, AC-DC Inverter, 415V 3Ph charger, interconnecting cables among - arrays, charge controller, DC-DC Converter, DCDB, ACDB, Battery bank, 3Ph charger etc as per enclosed SOR and specification.

2.2.2 Offered solar PV cells & Modules shall be from existing regular manufacturer's plant/unit . and have BIS certification of the Solar Photovoltaic Module. IEC/UL/CE certification is also accepted in case BIS is exempted as per the Indian Gazette order dated 13/07/2018 issued by MNRE.

2.2.3 A stand-alone dusk-dawn solar photovoltaic street lighting system for outdoor emergency lighting as per enclosed specification and SOR.

2.2.4 MV power and control cable (Cu-Conductor, XLPE – insulated, PVC sheathed, armoured, FRLS cables as required). Solar grade cable shall be used for the Module wiring & outdoor cables.

2.2.5 GI pipes, GI Cable-trays and accessories, cable markers, identifier tags, GI saddles and all other associated accessories as required for cable laying.

2.2.6 FLP (CMRI, PESO approved) type double-compression nickel-plated brass cable glands, tinned-copper lugs, clamping material etc. for cable termination.

2.2.7 Earthing including earthing pits, earth electrodes, earthing strips, grounding conductor of various sizes, Cu strip for flange jumper and Cu earth plates etc as per specification/standard drawing.

2.2.8 Lightning surge protection must be provided for the SPV array and other solar system components. MPPT/PCU/Charger Input side and Output side as per IEC 62305

2.2.9 Fabrication and supply of MS frames, supports, canopies and brackets for miscellaneous electrical equipments, including welding, supply of bolts, nuts etc for mounting and other necessary supplies, all inclusive of painting etc as required.

2.2.10 Two years operational spares as per list provided by the vendor.

2.3 INSTALLATION, TESTING & COMMISSIONING

2.3.1 Delivery to site, storage, Transportation from storage to site, Installation, earthing, testing, commissioning and performance test at site (full load test) of the complete Solar system with solar array, charge controller, 3Ph Grid Charger, battery banks, DC-DC Converters, AC-DC Inverter, Distribution boards, junction boxes, interconnecting cables etc as per enclosed specification, data sheets and SOR. Tenderer shall submit the sizing calculations for SPV array, charge controller, battery bank and 415V 3Ph charger. However the rating of each subsystem shall not be less than as indicated in SOR.

2.3.2 Installation, earthing, testing & commissioning of the stand alone dusk-dawn solar photovoltaic street lighting system including all civil work etc as required for outdoor emergency lighting as per enclosed specification and SOR.

2.3.3 Battery capacity test at site along with the all interlocking check of solar system with FCBC charger & solar charge controller, Bidder shall arrange the DG set and required resources for the testing and commissioning of the solar system.

2.3.4 Installation of earthing material and lightning system, testing and commissioning of complete earthing and lightning system as per specification and requirement.

2.3.5 Laying, Termination, Glanding, Ferruling of all interconnecting cables between sub array JBs, Main JBs, Charge controller, 3Ph charger, Battery Bank and DCDB.

2.3.6 Suitable trench/route/cable-tray shall be made by the solar power system contractor for laying of cables from solar array JBs to Charge controller.

2.3.7 Interconnecting cables among modules shall be laid in PVC conduits & tied with UV resistance cable ties. Cables from JB to control room shall be laid in Cable tray/PVC pipe of suitable size.

3.0 OTHER MISCELLANEOUS WORKS

3.1 Preparation of buried cable trenches, including, back filling, compacting providing of brick protection by second-class bricks, spreading of fine river sand, including all supplies.

3.2 The job includes repairing of all civil works damaged during installation of electrical facilities and complete solar system.

3.3 The scope of work under this contract shall be inclusive of breaking of walls, floors and chipping of concrete foundations necessary for the installation of equipment, materials, and making good of the same.

3.4 Minor modifications wherever required to be done in the owner free supplied equipments / devices to enable cable entry, termination etc.

3.5 Sealing of opening made in the walls / floors for cables trays, cables, bus ducts, etc. using acceptable practice and standards.

3.6 Supply and installation of all other accessories not specifically mentioned herein, but never the less necessary for completion of the job.

4.0 AREA CLASSIFICATION

Hydrocarbon handling areas have been generally classified as zone 1 & 2, gas group IIA/IIB as per IS: 5572, API RP-500, OISD - 113 and IP Rules. All equipments to be installed in these areas shall be suitable for the area classification with temperature class T3 (200˚C), CMRI testing and approved by CCOE, DGFAS and having BIS license.

5.0 JOB SPECIFICATIONS

5.1 Various electrical works covered under this contract like equipment erection, cabling, outdoor lighting (Solar) and grounding works, etc shall be performed in accordance with specifications attached with this tender. (Certain clauses of specifications, which are applicable to equipments or system not covered under this contract, shall not be applicable).

5.2 Erection and commissioning of certain special equipments shall be performed in accordance with supplier's instructions and directions of the Engineer-in-charges under supervision by equipment supplier/s.

5.3 The equipments/materials to be supplied by the contractor shall conform to the requirements of the applicable specifications enclosed in the tender document.

5.4 Price of erection & commissioning spares and special tools shall be included in the quoted price by the bidder.

6.0 MAKES OF EQUIPMENTS AND MATERIALS

All equipments / materials supplied by the contractor shall be as per the list of approved makes enclosed with this document.

7.0 INSPECTION, TESTING & COMMISSIONING

The contractor shall carry out all the tests as enumerated in the technical specifications and as per applicable codes and standards and QAP.

8.0 DRAWINGS AND DATA SHEET

8.1 Contractor shall submit drawings and data sheet as enumerated in the technical specification of the equipments / materials to be supplied.

8.2 After the job completion, contractor shall prepare **AS-BUILT** drawings and documents, submit catalogues/manuals (O&M) of major brought out items like solar system, charge controller, DCDB, battery bank, DC-DC Converter, junction boxes, 3Ph charger etc. Final certified as built drawings, documents and manuals etc shall be submitted by the contractor to owner in bound volume with one set in soft copy (CD) plus five sets of prints.

Annexure – I

STATIONWISE SOLAR SYSTEM DETAILS

S. No.	STATION DESCRIPTION	LOAD	REQUIRED NO. OF SOLAR SYSTEM
1	SV station	1400 W @ 72 hours battery back up	1 No. (Location of SV station shall be intimated later as per the requirement during the detail engineering)

Annexure – II

LIST OF TWO YEAR OPERATION & MAINTENANCE SPARES FOR EACH SET SOLAR SYSTEM

1	Solar Module	Nos	2
2	DC-DC Converter card, DC-AC Inverter Card & Other cards (consist of one no. of each card of charger, solar charge controller, DC-DC convertor & DC-AC Inverter)	Sets	1
3	MCB's & MCCB's (consist of one no. of each rating MCCB & MCCB of SCC & DCDB & DCDB converter)	Sets	1
4	Fuse of all ratings	Sets	1
5	Battery Cells	Nos	5
6	Push button, toggle switches, Rotary switches	Sets	1
7	Indicating lamp	Sets	1
8	Relays -10% with min. 1 No. for each type of relay	Sets	1
9	Contactors (AC, DC & Aux.)	Sets	1

	CONTRACTOR		**QUALITY ASSURANCE PLAN FOR ELECTRICAL EQUIPMENT**	CLIENT:	**M/s IGGL**
				PROJECT:	**DFL FEEDER LINE**
	ORDER NO. & DATE			PACKAGE NO.	**E0085**
	SUB-CONTRACTOR			PACKAGE NAME	**Electrical System**
	ORDER NO. & DATE				

INSTRUCTIONS FOR FILLING UP :

1. QAP shall be submitted for each of the equipment separately with break up of assembly/sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & tests may be added as applicable for the plant and equipment
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in tonnes (T) must be indicated under column 5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATIONS USED :

CONTR : CONTRACTOR

MFR : MANUFACTURER

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS:

Code Description

1. Visual
2. Dimensional
3. Fitment & Alignment
4. Physical Test (Sample)
5. Chemical Test (Sample)
6. Ultrasonic Test
7. Magnetic Particle Test (MPT)
8. Radiography Test
9. Dye Penetration Test
10. Measurement of IR Value
    a) Before HV Test
    b) After HV Test
11. High Voltage test/Dielectric test

Code Description

12. Routine test as per relevant IS other standard
13. Type test as per relevant IS/ other standard
14. Impulse Test
15. Partial Discharge Test
16. Heat run risc test\tempr.
17. Enclosure Protection Test
18. Calibration
19. Noise & Vibration
20. Test certificates for bought out components
21. Tank Pressure Test
22. Paint shade verification

Code Description

23. Short time rating
24. Operational & functional check
25. Over Speed Test
26. Flame Proof Test
27. Clearance and creepage Distance
28. Acceptance Test
29. Harmonics measurement.
30. BOQ Verification
31. Ferruling check

DOCUMENTS:

D1. Approved GA drawings
D2. Approved single line/ schematic diagram
D3. Approved data sheet
D4. Approved bill of materials
D5. Unpriced P.O. copy
D6. Calibration Certificate of all measuring instruments and gauges

EQUIPMENT DETAILS							INSPECTION AND TESTS						Test Certificates & documents to be submitted to MECON	Acceptance Criteria Standards /IS/ BS/ASME/ Norms and Documents	REMARKS / SAMPLING PLAN
Sl. No.	Description (With equipment heading, place of use, and Breif Specifications)	Indentificatuin No.	Quantity No/M	Quantity T	Manufacturer's Name and Address	Expected schedule of Final Inspection	Raw Material and inprocess stage inspection MFR	Raw Material and inprocess stage inspection CONTR	Raw Material and inprocess stage inspection MECON	Final Inspection/Test by MFR	Final Inspection/Test by CONTR/ TPIA	Final Inspection/Test by MECON/ IGGL			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	**Power & Lighting Distribution Board**		**Set**				**1,2,3,4, 24, 27**	-	-	**1,2,3,10,11,12, 22, 24,27,30,31**	**1,2,3,10,11,12, 22, 24,27,30, 31**	**1,2,3,10,11,12, 22, 24,27,30, 31**	**D1, D2, D3, D4, D5, D6, 20, 12,13*,16**	**I.S,Data Sheet, Specification, Approved Drawings**	**13* for similar rating**
2	**AVR**		**Set**				**1,2,3,4, 24, 27**	-	-	**1,2,3,10,12,16, 22, 24,27**	**1,2,3,10,12,16, 22, 24,27**	**1,2,3,10,12,16, 22, 24,27**	**D1, D2, D3, D4, D5, D6, 20, 12,13*,16**	**I.S,Data Sheet, Specification, Approved Drawings**	**13* for similar rating**
3	**Silent DG set with AMF panel**		**Set**				**1,2,3,4, 24, 27**	-	-	**1,2,3,12, 19,22, 24,27,29,30***	**1,2,3,12, 19,22, 24,27,29, 30***	**1,2,3,12, 19,22, 24,27,29, 30***	**D1, D2, D3, D4, D5, D6, 20, 12,13*,16**	**I.S,Data Sheet, Specification, Approved Drawings**	**30* for AMF Panel 13* for similar rating**
4.	**LT Power and Control Cable**		**Mt.**				-	-	-	**1,10,11, 12,13, 28**	**1,2,10,11, 12, 28**	**IWC**	**12,13,28 D3, D5, D6,**	**I.S., Data Sheet, Specifications & Test Certificate**	**13* for similar rating, Inspection to be done by TPI**
5	**UPS – System**		**Set**				**1,2,3,4, 24, 27,28**	-	-	**1,2,3,12, 16,22,23 24,27,28**	**1,2,3,12, 16*, 22, 23,24,27, 28,29**	**1,2,3,12, 16*, 22, 23,24,27, 28,29**	**D1, D2, D3, D4, D5, D6, 20, 12,13**	**Tech. Specification, Approved Drawings & Data Sheets**	**(*) 12 hour heat run test**
6	**Ni-Cd/ SMF Battery Set-UPS**		**Set**				**1,2,3,4, 24,27**	-	-	**1,2,3,12, 13,28**	**1,2, 28**	**1,2, 28**	**D1, D3, D4, D5, D6, 12,13**	**Tech. Specification, Approved Drawings & Data Sheets Test certificates**	**12, 13 Document to be reviewed by MECON**
7	**Solar Array with coplete hardware (JBs, Mounting Structure, cables etc)**		**Set**				**1,2,3,4, 24, 27**	-	-	**1,2,3,12, 13, 29**	**1,2,3,12, 28, 29**	**1,2,3,12, 28, 29**	**D1, D2, D3, D4, D5, D6, 20, 12,13,17,29**	**Tech. Specification, Approved Drawings, IEC: 61215 & 60904 & Data Sheets**	**12, 13 Document to be reviewed by MECON**

8	**Solae charge controller/Grid Charger**		**Set**				**1,2,3,4, 24, 27**			**1,2,3,12, 16, 22, 23,24,27**	**1,2,3,12, 16*, 22, 23,24,27**	**1,2,3,12, 16*, 22, 23,24,27,**	**D1, D2, D3, D4, D5, D6, 20, 12,13**	**Tech. Specification, Approved Drawings & Data Sheets**	**(*) 12 hour heat run test 12, 13 Document to be reviewed by MECON**
9	**Battery Set-Solar system**		**Set**				**1,2,3,4, 24,27**	**-**	**-**	**1,2,3,12, 13**	**1,2,28**	**1.2,28**	**D1, D3, D4, D5, D6, 12,13,20**	**Tech. Specification, Approved Drawings & Data Sheets Test certificates**	**12, 13 Document to be reviewed by MECON**

For Manufacturer (Stamp & Signature)	For CONTR (Stamp & Signature)	For MECON (Stamp & Signature)

Q.A.P. NO. MEC/05/E1/E0085/QAP/01

SHEET 1 OF 1 R-0

IWC –Inspection Waiver Certificate – TPIA shall witness inspection at Manufacturer's works. Contractor shall rasie Inspection call for Waiver , alongwith uploading TPIA's Inspection documents (IRN,IVR & other test reports) for Mecon's review, in Mecon's IMS portal. Mecon, after review of the documents & if found in order, shall issue Inspection Waiver certificate.

Inspection Categorization plan for Electrical Items

Inspection of various Electrical items shall be carried out as per following categorization plan:

S.No.	Item description	Site Acceptance based on Manufacturer Test Certificate review at site (In line with Approved documents)	Inspection at Manufacturer's works by TPIA (IWC by Mecon based on TPIA's Inspection doc)	Inspection at Manufacturer's works by IGGL/MECON
1	PDB-1/2, I-E LDB, PP LDB, OLDB	X	X	✓
2	Inverter with tubular battery	✓	X	X
3	Earthing material (Earth pit with GI Electrode/Cu plate Electrode, GI/Copper Strips, GI wire, GI Lightning rod, Advance Maintenance free earthing system)	✓	X	X
4	Power & Control Cables (LT)	X	✓	X
5	Lighting fixtures (FLP & Non-FLP type)	✓	X	X
6	Street Light Pole (6Mtr height)	✓	X	X
7	MCCB Enclosure – WP Outdoor type	X	✓	X
8	Ceiling/Wall	✓	X	X

	mounted Fans, Exhaust Fans,Air conditioners,			
9	Welding socket	✓	X	X
10	Cable Tray	✓	X	X
11	First Aid box	✓	X	X
12	Carbon-di-oxide (CO_2) type fire extinguisher	✓	X	X
13	Insulating Mast	✓	X	X
14	Telephone/LAN socket, LAN Swithes	✓	X	X
15	Telephone/LAN/UTP cable	✓	X	X
16	UPS sytem (excluding Battery, ACDB, DCDB, Interconnecting cables)	X	X	✓
17	AVR	X	X	✓
18	Silent DG set	X	X	✓
19	Solar system (along with Solar modules, Solar Charge controller, FCBC grid charger, Battery, DBs, Converters, Interconnecting cables, Balance of System etc)	X	X	✓
20	Solar steer light system	✓	X	X
21	N-Cd battery banks for existing SVs	X	✓	X
22	Battery banks for UPS	X	✓	X

LIST OF DATA SHEETS/ANNEXURES (ELECTRICAL)

Sl. No.	Description of Data Sheets	Data Sheet No.
1	LV SMALL POWER DISTRIBUTION BOARD	MEC/DS/05/E9/076A
2	SOLAR PHOTO VOLTAIC (SPV) POWER SUPPLY SYSTEM	MEC/DS/05/E9/078
3	BATTERY CHARGER	MEC/DS/05/E9/28
4	UN-INTERRUPTED POWER SUPPLY (UPS) SYSTEM-3 Phase Charger.	MEC/DS/05/E9/071
5	UN-INTERRUPTED POWER SUPPLY (UPS) SYSTEM-1 Phase Charger.	MEC/DS/05/E9/071A
6	Automatic Voltage Regulator	MEC/DS/05/E9/073
7	DG set	MEC/DS/05/E9/074

REV. : 0
Edition : 1

DATA SHEET

FOR

LV SMALL POWER DISTRIBUTION BOARD

DATA SHEET NO. - MEC/DS/05/E9/076A

(OIL & GAS SBU)
MECON LIMITED

ANNEXURE - I

	Switch Board	
1.1	Rated voltage and frequency	415V, 3phase, 4 wire, 50Hz
1.2	Maximum voltage	500V
2.0	Continuous current rating at design ambient temperature	As per approved SLD at 45˚C with IP 52 enclosure
3.0	Type of enclosure as per IS 2147	IP 52
3.1	Minimum thickness of sheet steel	2mm
4.0	Applicable standards	IS 2147, 8623
5.0	Design ambient temperature	45˚C
6.0	One second short time rating of switch board with minimum busbars, feeder busbars, kA(RMS)	As per SLD
7.0	Dynamic through fault current with complete busbars, kA (peak)	
8.0.	The formation (Max.)	Max 6
9.0	Maximum No. of cable terminations in each type of cubicle	
9.1	Size and no.	As per SLD
10.0	Incoming termination of LT switch board	As per SLD
11.0	Incoming termination top/bottom	Bottom for cable Top for busduct
12.0	Outgoing feeder cable entry top/bottom	Bottom
13.0	Minimum clearances at front and back of board	1.5m/1m
14.0	Dimensions LxBxH	
15.0	Maximum Dimensions of shipping sections LxBxH	2.5 x 1.5 x 2.4M
16.0	Min. clearances in air in mm	
16.1	Between phases	25.4mm
16.2	Between live parts and ground	19.0mm
17.0	One minute PF withstand voltage	2.5kV
18.0	Paint shade	631 of IS-5
	Busbars	
1.0	Busbar material & cross section	

1.1	Main busbars	E91E aluminium' Max. current density 0.6A/mm^2
1.2	Bus connections to circuit breakers	
2.0	Continuous rating at design ambient	
2.1	Main busbars	As per SLD
2.2	Bus connections to circuit breakers	As per rated current of
3.0	Temperature rise at rated continuous current of the busbar in the busbar chamber	40deg.C over 45deg.C
4.0	Type of busbar insulators	Resin cast/fibre glass
	Breakers/SFU	
1.0	Type of breakers	As per SLD
2.0	Standards applicable	IS 13947-2/IEC947 – part-II
3.0	Rated service voltage	415V, 3ph., 50Hz
3.1	Highest system voltage	500V, 3ph., 50Hz.
4.0	Rated current at design ambient for breakers	As per SLD
4.1	Rated with breaker in IP 52 enclosure in two tier formation in the LT switch board	As per SLD
5.0	Symmetrical breaking capacity im kA (RMS)	
	-at 415V, 0.25 PF	50 kA RMS
	-at 440V, 0.25 PF	50 kA RMS
6.0	Making capacity kA (Peak)	105kA Peak
7.0	Capacitor breaking capacity at 440V	Incomer: 600A (min.) Outgoing: 300A(min.)
8.0	1 sec. Short time rating, kA (RMS)	50kA RMS
8.1	With release in any setting	50kA RMS
9.0	Thermal release setting ranges (temperature compensated)	As per SLD
10.1	Short circuit release range	As per SLD
10.2	Short circuit release timer setting range	0.1 to 0.6 sec. mechanical
Note	All the releases O/L, S/C and E/F shall be Static/microprocessor based.	

ANNEXURE – II

PREFERRED MAKES

LIST OF EQUIPMENTS	PREFFERED MAKES
SFU	SIEMENS/ABB/L&T/ GEC ALSTOM
ACB	SIEMENS/ABB/GEC ALSTOM/ L&T
MCCB	GEC ALSTOM/CROMPTON GREAVES/L&T/ SIEMENS
CONTROL VOLTAGE TRANSFORMER	SIEMENS/SOUTHERN ELECTRIC/KAPPA/SWAMY TRADERS
LT BUS DUCT	C&S/ BEST&CROMPTON / STARDRIVE
CONTACTORS	SIEMENS/TELE-MECHANIQUE BCH/ABB/ L&T
OVERLOAD RELAYS WITH SPP	SIEMENS/L&T/TELE-MECHANIQUE BCH/ABB
MINIATURE CIRCUIT BREAKERS	SIEMENS/MDS/INDO KOPP/ HAVELLS
AMMETER	AE/IMP/MECO/ RISHAB
VOLTMETER	AE/IMP/MECO/ RISHAB
PUSH BUTTONS, INDICATION LAMPS	VAISHNO/CONCORD/SIEMENS/L&T/ TTTEKNIC/SALZER
CT'S	SIEMENS/AE/INDCOIL/KAPPA/ INTRANS
TERMINAL BLOCKS	ELMEX/ESSEN/ CONNECT WELL/ WAGO/ PHOENIX
CABLES	INCAB/RPGCABLES/UNIVERSAL/CCI/NICCO/ SPECIAL CABLES / POLYCAB
SELECTOR SWITCHES	SIEMENS/EE/KAYCEE/SALZER
CABLE LUGS	DOWELLS
FLAMEPROOF EQUIPMENT	Baliga/ CEAG/ FCG/ Sudhir / Flamepack
PROTECTIVE RELAYS	Alstom / ABB / GE Multiline / Easun Reyrolle / Siemens

ANNEXURE – III

List of Mandatory Spares

The spare parts as listed below shall be quoted for the Electric Panel along with the offer with item wise unit prices:

1. Contractor	1 No. of each rating
2. Fuses	10% of each rating
3. Overload Relay with single phasing preventer	1 No. of each rating
4. Indication Lamps	10% of total installed installed quantity
5. MCB &MCCB	One no. of each rating.
6. Control Switches	One no. of each rating.
7. Height adjustable circuit breaker trolley For removal and replacement of the Withdraw able circuit breaker carriage	one number
8. Meters	one no. of each type

NOTE: All spare parts shall be identical to the parts used in the distribution boards.

Rev.: 2
Edition: 1

DATA SHEET
FOR
SOLAR PHOTO VOLTAIC (SPV)
POWER SUPPLY SYSTEM

DATA SHEET NO. - MEC/DS/05/E9/078

(ELECTRICAL SECTION)
MECON LIMITED
DELHI 110 092

ANNEXURE – I

PURCHASER'S DATA FOR SOLAR PHOTO VOLTAIC (SPV) POWER SUPPLY SYSTEM

1.0	**SOLAR SYSTEM**	
1.1	Type	Solar Photovoltaic (SPV)
1.2	System/Application	Cathodic Protection (48 V DC), Instrumentation (24 V DC), SCADA (24 V DC) & Telecom (-48 V DC), F A & CO_2 flooding system (230 V AC)
1.3	Daily load demand of system	1250W continuous load
1.4	System rating (KWp)	As Per SOR
1.5	Earthing system	Two wire isolated system, For -48V supply as per requirement.
1.6	Battery Back up	As per SOR
1.7	Location	**DUPL-DPPL Pipeline**
1.8	Wind Velocity	Min 55 m/s or as Per Site Condition/Survey data. It may be ensured that the design has been certified by a recognized Lab/ Institution in this regard and submit wind loading calculation sheet to MECON.
1.9	Ambient Temperature	Max. 50 deg C, Min 2 deg C
2.0	**SOLAR PANEL**	
2.1	Module output Watts (Wp)	≥500Wp
2.2	Insolation data	As per site condition, However average insolation value shall not be higher than 5.2 kWH/Sq.M/Day
2.3	Number of no sun days	03 days
2.4	Nominal voltage of solar array	96V DC
2.5	PV Array mounting	Structure mounting on roof/ground
2.6	De-rating Factors to be considered a) Solar array- (Module deterioration x dust deposit x Module mismatch x line resistance of cable x Array wiring x panel orientation x Rise in temp. x Charge controller eff.) c) Ageing factor	0.7

	b) DC-DC converter efficiency c) Battery Efficiency	0.80 0.80 0.9
2.7	Solar module framing material	Withstand up to Min 55 m/s wind velocity and Temp Range as specified.
2.8	Material of bird spikes	N/A
2.9	Degree of protection of Solar Array and junction box	IP65
2.10	Supporting structure	Anodized AL/Hot dipped Galvanized MS
2.11	Expected life span	20 years @ 80% of initial power rating
2.12	Structure Design	The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Necessary protection towards rusting need to be provided either by coating or anodization.
2.13	Fasteners	The fasteners used should be made up of stainless steel
3.0	**SOLAR CHARGE CONTROLLER-MPPT Charger**	
3.1	Type of charge Controller	Parallel Redundant (2x100%), Automatic changeover through static switch, MPPT type FCBC (Automatic & Manual Float cum Boost Charging) type
3.2	Enclosure degree of protection	IP 31
3.3	Mounting	Wall / floor
3.4	Cable entry	From Bottom
3.5	Rating (Amp)/KW	As per design calculation
3.6	Charger I/O	a) Transducer shall be provided for – 1)Solar array Voltage & current 2)Battery voltage & current, 3)Load Voltage & current (24V, 48V), (4-20 mA Output) Compatible I/o for SCADA system b) Potential free contact & static switch (NC type)- 1. Battery deep discharge -battery bank (up to

		70% discharge) 2.Solar controller fail 3. Alarm for bank voltage becomes 88V DC (Adjustable). c) Interlocking logic between solar charger controller & FCBC Grid charger to enable automatic changeover as specification. d) Digital Output from SCADA DO 1. SOLAR ARRAY START 2. SOLAR ARRAY STOP 3. SOLAR ARRAY RESET Serial port shall also be provided for each charger for communication on ModBus protocol.
4.0	**415V 3x1 Ph FCBC CHARGER (Refer Charger Data sheet for more details)**	
4.1	Type of charger	DSP controlled PWM, FCBC (Automatic Float cum Boost Charging) type
4.2	Rating	As per design calculation @ C10 rating
4.3	Arrangement	As per drawing
4.3	Charger I/O	Potential free contact for charger 'ON' and available power supply Feedback for SCADA system and other as per charger specification a) Grid Supply of individual phases b) Charger ON/OFF c) I/P Current (R,Y,B) d) I/P Voltage (R,Y,B) e) O/P Current f) O/P Voltage g) Charger Fail
4.4	Output Voltage	96V DC/ As per design
4.5	Enclosure protection	IP 42
4.6	Mounting	Floor
4.7	Cable entry	From Bottom
4.8	Efficiency	>90% @ 100% load
4.9	Remote monitoring for all operating data of charger along with alarms on serial communication	RS485-ModBus protocol

5.0	**BATTERY BANK**	
5.1	Make	As per approved vendor
5.2	Type	Ni-Cd type battery bank
5.3	Mode of arrangement	2x50% (Provision made to isolate individual bank from Charge controller/grid charger for preventive maintenance) & Charging of individual battery bank from individual charger.
5.4	AH Rating	As per SOR
5.5	Self discharge of battery	<3% per month at 20 deg C <6% per month at 30 deg C
5.6	Battery Sizing: i) Battery end cell voltage (Min) ii) Battery De-rating factor to be considered: Aging Temp. Correction DOD (Depth of discharge) DC-DC conversion efficiency iii) Battery stand formation	 1.1 V/Cell (As Calculated/ As per Manufacturer Standard) 0.8 As per min. site temp (0 deg C) 70% 80% Battery stands in double row/ double tier formation
5.7	Charge efficiency	>95% up to 70% state of charge
6.0	**DCDB**	
6.1	Type	Non draw-out type, Front operation & maintenance type with Voltmeter and Ammeter.
6.2	Degree of protection	IP 31
6.3	Mounting	Wall mounted
6.4	Cable entry	From bottom

5 (a)	**DCDB (With suitable fuses)-24V** 1) No. of I/C feeder (DC MCB –DP 63A) - 2 No. 2) No. of O/G feeders (DC MCB –DP 16A) - 4 No. (DC MCB –DP 10A) - 4 No. (DC MCB –DP 6A) - 5 No. 20% Spare Feeder to be provided. **DCDB (With suitable fuses)- +48V & -48V** 1) No. of I/C feeder (DC MCB –DP 16A) - 2 No. 2) No. of O/G feeders (DC MCB –DP 10A) - 4 No. (DC MCB –DP 6A) - 4 No. 20% Spare Feeder to be provided. 1) No. of I/C feeder (DC MCB –DP 16A) - 2 No. 2) No. of O/G feeders (DC MCB –DP 10A) - 3 No. (DC MCB –DP 6A) - 3 No. 20% Spare Feeder to be provided.	
7.0	**PCU (MMPT-Inverter)**	
7.1	Switching Device	IGBT/MOSFET
7.2	Applicable standards	Applicable IEC/BIS
7.3	Control	DSP type, Dual MPPT PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown
7.4	AC Output Voltage	415V AC +/- 2% (Range 320-480V), Pure sine wave
7.5	Operating voltage range	+/-20%
7.6	Output Frequency	50 Hz
7.7	Operating frequency range	47-53 Hz
7.8	Enclosure Protection	IP-65 for Outdoor IP-42 for Indoor
7.9	Full Load THD	< 3%

7.10	Power factor (adjustable)	+/-0.8
	Efficiency	
7.11	Peak Efficiency	Min 98%
7.12	EURO Efficiency	Min 97%
7.13	No Load Loss	Less than 1% of rated power
7.14	Remote Monitoring	Built-in meter and data logger to monitor plant performance through external computer/Laptop shall be provided.
7.15	Display/User interface	LCD
8.0	**JUNCTION BOXES**	
8.1	Type	FRP/Thermo Plastic, Dust vermin and water proof
8.2	Degree of protection	IP65
8.3	Mode of arrangement	Sub array JBs than Main JB with facility for test point for quick fault location
9.0	**DC-DC CONVERTER (24V & 48V)**	
9.1	Type	Each convertor shall be parallel redundant (2x100%) with Galvanic Isolation
9.2	Input Voltage	85-135V DC (As per design)
9.3	Output voltage	24V DC & (+)48V-0V-(-) 48V
9.4	Accuracy	+/-1%
9.5	Efficiency	>90%
10.0	**SOLAR STREET LIGHTING SYSTEM**	
10.1	Type	Stand alone, Dusk-Dawn type
10.2	PV Module	150 Wp
10.3	Lamp	20 W LED (As per SOR)
10.4	Voltage	50-60 V AC
10.5	Battery Rating	150 Ah (3 Day Autonomy) (2x75AH arrangement)
10.6	Battery Type	Tubular Low maintenance type lead acid for solar application
10.7	Indications	Green LED-Charging in progress Red LED- For deep discharge
11.0	**CABLE AND ACCESSORIES**	

11.1	Interconnecting Cables Type	Cu- conductor XLPE Insulated, PVC sheathed, armoured/unarmoured FRLS type
11.2	Cable gland type	Double compression type
11.3	Lugs-type	Tinned Cu
11.4	Other accessories	As required
12.0	**SPACE AVAILABLE FOR MOUNTING OF SOLAR ARRAY IN EACH EXISTING TERMINAL**	
12.1	On Building top	----------
12.2	On ground	----------
13.2	Total plot size	SV station-45mx45m, IP station-75mx75m

ANNEXURE – II

TECHNICAL DATA FOR SPV POWER SUPPLY SYSTEM
(To be submitted up by the successful bidder)

1.0	**SOLAR ARRAY**	
1.1	Manufacturer's Ref. No./ Model No.	
1.2	Size of solar system	**Sizing calculation after award of bid**
1.3	No. of Solar panel/array	**Sizing calculation after award of bid**
1.4	Applicable codes/standards	
1.5	Steady state output volt	
1.6	Mode of Arrangement	
1.7	Peak power output of each module (Pmax, Watts)	
1.8	Current at Pmax (Imax)	
1.9	Voltage at Pmax (Vmax)	
1.10	Short circuit current (Isc)	
1.11	Open circuit voltage (Voc)	
1.12	Dimensions (in mm)	
1.13	Degree of protection of the panel.	
1.10	Tilt factor	
1.11	Loss factor	
1.12	Efficiency at 100% load	
1.13	Type of control circuit	
1.14	No. of days autonomy	**As per SOR**
1.15	Total space requirement of the Arrays (Sq-m)	
2.0	**CHARGE CONTROLLER-MMPT**	
2.1	Rating (Amp.) / kW	**Sizing calculation after award of bid**
2.2	Output voltage under float/boost charging condition	
2.3	Type / Mode **Refer Block Diag. No. MEC/SD/05/E9/E/078/01 & 02**	**DSP type PWM Charger**

3.0	**GRID CHARGER (415V, 3x1Ph)**	
3.1	Rating (Amp.)/KW	**Sizing calculation after award of bid**
3.2	Output volt under float/boost charging condition	
3.3	Type/Mode	
3.4	Interlocking with SPV charge controller	
4.0	**BATTERY**	
4.1	Make	
4.2	Type (Enclose catalogue)	Ni-Cd
4.3	Type of construction	
4.4	AH rating	**Sizing calculation after award of bid**
4.5	Battery charge eff.	
4.6	Mode of arrangement	2X50%
4.7	Nominal cell voltage	1.2 V / Cell
4.8	End cell volt. At specified discharge rate (V/ cell)	
4.9	No. of cells	
4.10	Recommended Float charging voltage per cell	
4.11	Maximum Float charging voltage per cell	
4.12	Recommended Boost charging voltage per cell	
4.13	Maximum Boost charging voltage per cell	
4.14	Accessories for battery	Included.
4.15	Dimension of battery bank stand (WXDXH)	
5.0	**INDICATIONS AND ALARM**	
5.1	**METERING & INDICATION–** i) Voltage and Current from Solar Array. ii) Load Voltage and current iii) Battery current and voltage with indication of status – “in charge” or “discharge”. iv) Solar array Voltage and Current. v) Annunciation for battery deep discharge of battery. vi) Indication for charging of battery from solar	

	charge controller or grid charger	
5.2	Confirmation on Remote Monitoring of the solar system through SCADA as per specification (Protocol shall be ModBus).	
6.0	**DIMENSIONS FOR EACH SYSTEM**	
6.1	Solar Array	
6.2	Battery Bank	
6.3	Charge Controller	
6.4	3x1Ph Grid Charger-FCBC	
7.0	**PCU/Inverter**	
7.1	Manufacturer Name	
7.2	Model No.	
7.3	Rating	
7.4	Peak Eff.	
7.5	Euro Eff.	
7.6	Degree of Protection	
7.7	Remote Monitoring	
7.8	Make of Laptop with software supplied with the PCU	
7.9	Nos. of MPPT	

ANNEXURE – III

TECHNICAL DATA FOR SOLAR STREET LIGHITING SYSTEM
(To be submitted up by the successful bidder)

1.0	**SOLAR MODULE**	
1.1	Peak Power (Wp)	
1.2	Peak Voltage	
1.3	Peak Current	
1.4	Open Circuit Voltage	
1.5	Short Circuit Current	
1.6	Nominal Voltage	
2.0	**BATTERY**	
2.1	Make	
2.2	Type	
2.3	Ah rating	
2.4	System Autonomy	
2.5	Nominal Voltage	
2.6	Depth of discharge	
3.0	**LUMINARY ASSEMBLY**	
3.1	Type of lamp	
3.2	Luminous Efficiency	
4.0	**DIMENSIONS:** (Enclose Catalogue**)**	

ANNEXURE – IV

CHECK LIST (To be submitted by the Bidder)

Sl. No	Description	Remarks
1	Deviation from specification	Offer may be rejected if there is any deviation
2	Solar Array sizing calculation enclosed	After award
3	Charger sizing calculation enclosed (both solar and grid charger)	After award
4	Battery sizing calculation enclosed	After award
5	PCU Model no. & Rating	After award
6	PCU Sizing calculation	After award
7	List of spares, tools & tackles for PCU system.	Yes/No
7	Solar Array, Battery catalogue enclosed	Yes/No
8	Confirmation for Inspection of Solar Array, charge controller, PCU and battery as per Specification/QAP.	Yes/No
9	Confirmation for Remote monitoring of the parameters through SCADA system (Hook-up with Owner's SCADA system through RS232/485) and automatic changeover between grid charger & solar Charger.	Yes/No
10	Confirmation that Solar System Offered can be accommodated in plot area (Refer enclosed plot plan).	Yes/No
11	Confirmation on Dimension of Solar Array, Charge Controller, 3Ph Charger and Battery Bank as per the available space and can be accommodated in the available space in electrical room.	Yes/No
12	Unpriced schedule of rate (SOR) enclosed.	Yes/No
13	Confirmation on submission of design on PVSyst. Bidder shall have valid Licence for the same. (Submit the details along with Bid)	Yes/No
14	Guaranteed Energy Generation For 25 Years (year-wise) of 20kWp On-grid system.	Yes/No

Rev: 1
Edition: 1

DATA SHEET

FOR

BATTERY CHARGER

SPECIFICATION NO.: MEC/DS/05/E9/28

(OIL & GAS SBU)
MECON LIMITED
DELHI 110 092

AMENDMENT STATUS

Sl. No.	Clause / Paragraph / Annexure / Exhibit / Drawing Amended	Page No.	Revision	Date	By (Name)	Verified (Name)
1	Bidirectional FCBC specification provided	-	1	Aug 2019	AM	MKJ

PREPARED BY:	CHECKED BY:	APPROVED BY:	ISSUE DATE :
(A.Moyal)	(M.K.Jaiswara)	(D.G.Majumder)	ISSUE DATE : Aug. 2018
(A.Moyal)	(M.K.Jaiswara)	(D.G.Majumder)	ISSUE DATE : Aug. 2019

PURCHASER'S DATA FOR BATTERY CHARGER

1.0	**415V, 3Ph FCBC -BATTERY CHARGER-Unidirectional**	
1.1	Type of charger	415V 3 Phase Charger working on Individual Phase with DSP controller
1.2	Input Power Supply	Line voltage - 415Vac ,3 Phase with Neutral, 50 Hz 330 ~ 460 Vac, 47 ~ 53 Hz. Phase Voltage- 230Vac, 1Phase (variations)
1.3	Rating (KW)	As per design calculation @ C10 rating of total battery bank capacity
1.4	Output Voltage	Boost Mode: Constant current charging up to Vboost (Voltage level settable from 70V – 150 V) (user selectable), followed by constant voltage at Vboost. Float Mode: Constant Voltage charging, in the rage of 70V – 120 V (user selectable). Maximum current in both mode shall be user selectable (current limit). The above values of charging shall be decided during the detail engineering as per the recommendation of the battery manufacture.
1.5	Output Current	**1250 W system-** Min. C10 rating @ when 3-phase supply is available at input terminals and voltage is 330Vac. Charger shall be designed to deliver current not less than C10/3 Amp when at-least single phase (180 ~ 250 Vac) supply is available at input terminals. Charger shall be designed to charge the two bank of existing Ni- Cd batteries in both manual boost & auto float mode (user selectable).
1.6	Battery Specification & Rating	As per SOR
1.7	Indications /Annunciations	a) 'R" Phase ON b) 'Y' Phase ON c) 'B' Phase ON d) Charger ON e) Charger Fail f) Current limit / System over load g) Boost charge h) Float charge
1.3	Arrangement	In 1X100%, shall be connected to both battery banks

		with provision to charge each battery bank individually.
1.4	Charger I/O for remote monitoring	a) Isolated 4-20 MA signals for i) DC output Voltage : 0 to 220V DC ii) DC Output Current : 0 to 75A b) Potential free contacts for i) AC power availability ii) System Fault iii) Charger ON (All Chargers)
1.5	Meters /Instruments	a) Grid Side: Phase Voltage, Phase Current, Frequency, Power, Power Factor of each Phase b) DC O/P Voltage (Digital) c) DC O/P Current (Digital) d) Leakage Current (Analog) e) BATTERY CURRENT AND VOLTAGE WITH INDICATION OF STATUS - "IN CHARGE" OR "DISCHARGE". (Analog) f) Load Side: AC Side—O/P Phase Voltage, Phase Current, Frequency, Power, Power Factor DC Side-O/P Voltage & Current of each charger g) System level: Mode of Operation, Active Faults, Heat Sink/ IGBT temperature, System Mimic.
1.6	Graphical User Interface(LCD Display)	a) Battery Side: Voltage, Current b) Grid Side: Phase Voltage, Phase Current, Frequency, Power, Power Factor c) System level: Mode of Operation, Active Faults, Heat Sink/ IGBT temperature, System Mimic
1.7	Protections & Alarms (With LCD Display)	a) Over voltage b) Under Voltage c) Over Current d) Over Temperature Trip (Heat Sink Temp.) e) Over charging protection f) Short circuit g) Over Temperature Trip (Heat Sink Temp h) Earth fault i) Lightning surges (in both input & output) j) Manual selection of Float & Boost Mode k) Fuse Failure
1.8	Monitoring signal for remote SCADA monitoring	All parameters of FCBC shall be available along with Solar charge controller parameters on a single MODBUS RS-485 bus. Minimum required signals are as below-

		i) DC output Voltage: 0 to 200V DC or as per the design ii) DC Output Current: 0 to 200A or as per design iii) FCBC Input Voltage & Current of each phase b) Potential free contacts for i) AC power availability of each phase (R, Y, B) ii) Charger ON
1.9	Output Voltage	80-150V DC/ As per design
1.10	Enclosure protection	IP 42
1.11	Mounting	Floor
1.12	Cable entry	From Bottom
1.13	Efficiency	>90% (Overall) @100% load
1.14	Material used inside charger	All the materials for connections, cables, bus bar, transformer winding etc shall be of copper with suitable rating.
2.0	**415V, 3Ph FCBC -BATTERY CHARGER-Bidirectional-AFE Type IGBT Based**	
	Inverter	
2.1	DC Voltage	As per array selection
2.2	Output Voltage	415V AC +/- 2% (Range 320-480V)
2.3	Waveform	Pure sine wave
2.4	Frequency	50 Hz (Range 47-53Hz)
2.5	Peak Inverter Efficiency	More than 90%
2.6	Full Load THD	< 3%
2.7	Change Over time	Less than 15 ms or as decided during detail engineering
2.8	Input Isolation	Transformer of Suitable rating (Cu Wounded)
2.9	Grid Charging Current	Selectable/Off
2.10	Input Power Factor	Near to Unity
2.11	Input Voltage Range-Charging	330-460 V, 50Hz +/-5%
2.12	Battery Charging Current & Voltage	Selectable
2.13	Available Modes	Hybrid, Grid Export, Standalone
2.14	Grid Feed Mode	Enable/Disable selection option

2.15	Battery Buffer/Available Capacity setting for Grid Export	Available As decided in detail engineering
2.16	Fault reset & Auto Reset and manual reset	As per user defined (Decided during detail engineering)
2.17	Display	I/P- Voltage , Current, Hz & Pf O/P- Voltage , Current, Hz & Pf Battery- Voltage, Current, Charging & Discharging Solar- Voltage, Current, HW & KWH Exported Fault Log, Status, Alarms & Operation Mode selected & Configuration Other as per manufacture standard
2.18	Indications Alarms	Grid-On, PV-On, Grid Charger-On, Inverter-On, Load on PV/Charger/Battery O/P Under/Over Voltage, Battery Low, Overload, Short Circuit Other as per manufacture standard For warning and faults
2.19	MPPT	Shall be provided
2.20	MPPT Voltage range	As per design
2.21	Reverse power protection	Shall be provided
2.22	Charger Efficiency	More than 95%
2.0	**CABLE AND ACCESSORIES**	
2.1	Interconnecting Cables Type	Cu- conductor XLPE Insulated, PVC sheathed, armoured FRLS type
2.2	Cable gland type	Double compression type
2.3	Lugs-type	Tinned Cu
2.4	Other accessories	As required

REV. : 3
Edition : 1

DATA SHEET

FOR

UN-INTERRUPTED POWER SUPPLY (UPS) SYSTEM

SPECIFICATION NO.- MEC/DS/05/E9/071

(OIL & GAS SBU)
MECON LIMITED
DELHI 110092

ANNEXURE-I

PURCHASER'S DATA FOR UPS

1.0	**INPUT POWER SUPPLY**	
1.1	Voltage/freq./ phase:	415 V (+) 10% & (-)15%, TPN, 50 Hz ± 5% or 230V AC single phase (voltage range-To be provided by Bidder) As per SOR
1.2	System fault level	10 kA for 1 Sec
2.0	**SITE CONDITION**	
2.1	Design Maximum / Minimum temperature	50^0C/2^0C
2.2	Max. Relative Humidity	95%
2.3	Altitude	Below 1000.0 M MSL
3.0	**OUT PUT REQUIREMENT**	
3.1	Voltage/ Phase	230V ± 1% AC, Single phase 2 wire
3.2	Output waveform & frequency	Pure Sinusoidal Wave
		50 Hz ± 0.1%
		Voltage distortion (THD): Less than 3% for linear loads & Less than 5% for non linear loads.
4.0	**SYSTEM REQUIREMENTS**	
4.1	Rating KVA	**As per SOR**
4.2	Type of inverter	The inverter circuit should be IGBT based, fully microprocessor controlled with PWM Technology or Latest proven technology
4.3	Overload capacity	125% of the rated output for 10 minutes & 150% for 1 minute.
4.4	Mode of operation	Dual/Parallel Redundant with static bypass & Dual Redundant rectifier as specified in SOR/Design basis/Block diagram
4.5	Inverter efficiency	>85% at 100% of load and >80% at 25% of load
4.6	Installation	Floor Mounted
4.7	Type of enclosure	Minimum IP-31
4.8	External Cable Connection	From Bottom
4.9	Internal protection	All live parts shrouded
4.10	Earthing	Doubly Earthed (Two distinct terminals to be made available)
4.11	Cooling	Forced ventilation with fans

4.12	Noise Level	• <65 dB at full Load from 1 mtr distance (for UPS of rating 5kVA, 7.5kVA & 10kVA) • <75 dB at full Load from 1 mtr distance (for UPS of rating 15kVA & 20kVA)
4.13	Crest Factor	≥3:1
4.14	Input Power Factor	> 0.95
4.15	Load Power Factor	0.8 (with variation between 0.6 to 1.0)
4.16	Overall efficiency	> 80%
4.17	Harmonics	As per IEEE 519 (Total demand distortion not more than 5.0%)
5.0 Rectifier/Charger		
5.1	Input voltage	415 V (+) 10% & (-) 15%, TPN, 50 Hz ± 5% or 230V AC single phase (voltage range-160V AC to 270V AC) or 230V ± 1% AC from UPS (As per SOR).
5.2	Automatic phase selection device	As per SOR
5.3	Output DC voltage/Load	**As per Manufacturer Design**
5.4	Input Power factor	> 0.95 at rated load
5.5	Input current THD (Total Harmonic Distortion) at nominal load	<= 5 %
5.6	Overload Capability	125% minimum for 10 min. 150% minimum for 1 min
5.7	Inrush current	Limited by soft-start circuit
5.8	Output voltage tolerance	+/- 1%
5.9	DC voltage ripple	<1% With battery connected <2% Without battery connected
5.10	Rectifier	IGBT based
5.11	Filter	Input side line filter
5.12	Harmonics	As per IEEE-519 (Voltage THD <5%, largest single voltage harmonics <3%, Input Current THDi <5%
5.13	Charging	Automatic Float and Boost charging (selection as per battery charging state (voltage level))
6.0 Bypass		
6.1	Automatic Bypass	Static bypass to provide an un interruptible transfer of load in case of failure of any system component or malfunctioning or overload & the load shall return on the UPS when the malfunctioning or overload is cleared

6.2	Input connection	Separate for each UPS
6.3	The switching time from inverter to bypass & vice versa	No break type
6.4	Manual/Maintenance Bypass	Shall be provided
6.5	Overload on bypass	125% minimum for 10 min. 150% minimum for 1 min.
6.6	Connectivity	Ethernet / Preferably Modbus RS 485 (To be decided during detailed engineering)
7.0 Battery Bank		
7.1	Type of Battery	**As per SOR**
7.2	Battery Arrangement	**2 X 50%**
7.3	i) Battery end cell voltage ii) Battery stand formation iii) Battery back up time iv) De-rating factor	As per specification (clause no. 3.5) As per battery manufacturer As per SOR (i) Ageing -- 0.8 (ii) State of Charge -- 0.88 (iii) Temp. Correction -- As per min. site temp. (Ref. 2.1 above) The rectifier/charger output current & voltage shall be limited to the battery supplier's recommendation.
8.0 Alarms, Indications and LCD Display		
8.1	Single line Power Flow Diagram (Mimic diagram) with LED indications of UPS status (i.e. Mains present, Battery charging & discharging, Low battery Voltage and unit on bypass).	
8.2	Digital panel Meter with LCD display (touch screen / touch pad) shall be provided for monitoring viz.	a) Input AC Voltage, current, frequency b) Output AC Voltage, current, frequency. c) Battery current and voltage d) Total run time e) Mains ON/OFF/TRIP, Mains Over/Under voltage, Phase fail f) Inverter ON/OFF, Inverter Over/Under voltage, inverter overload, over heat & load in % on inverter. g) Battery voltage low, Battery AH in % h) Battery Operation Boost Charge, Float Charge with of status - "in charge" or "discharge" i) Load on bypass or inverter. Detailed UPS Status with Operation/faults history

8.3	Audible Alarms With LCD Display-	a) Mains Failure b) Battery Low c) UPS fault (Continuous) d) Inverter Under-voltage e) Over Temperature (Continuous) f) Inverter Overload (Continuous)
9.0 Protective Features		
9.1	Input	Mains Over voltage, under voltage, phase failure
9.2	Inverter	Over voltage, short circuit, overload, over temperature
9.3	Battery	Under voltage at battery terminal, Battery over charge, Battery Over current
9.4	Rectifier & Battery charger	Maximum current limiting Over temp. Trip Boost charging and float charging current limiting with back up protection against over charging.
10.0 Distribution boxes		
10.1	Distribution Board Details	**(As per tender drawings / SOR)** **(1)ACDB 230V, Single Phase (1 No.) :** Incomer: 32A/63A/100A MCCB (As per UPS capacity 5KVA/7.5KVA/15 KVA) or more for higher capacity UPS. Outgoing: Combination of DP MCB's : 32A MCB DP-5 nos., 16A MCB-4 nos., 10A MCB- 5 Nos. 6A DP MCB- 6 nos. (The rating of above mentioned feeders may change during detail engineering, Bidder shall provide all required feeders as per requirement without any financial implications.)
11.0	**Battery Monitoring System**	**Yes with communication**
12.0	**UPS communication**	**Ethernet / preferably Modbus RS 485** **(To be decided during detailed engineering)**
13.0	**Selector switch**	**For Auto manual switch for Float and boost selection**
14.0	Toggle switch	**Float and Boost selection**

ANNEXURE-II (A)

TECHNICAL DATA FROM MANUFACTURER
(To be filled up by the Tenderer)

1.0	**INVERTER**	
1.1	Manufacturer's Model No. (**Enclose catalogue**)	
1.2	Rating (at specified ambient) / no. of phases	
1.3	Applicable codes/standards	
1.4	Steady state output volt/freq (230 V ± 1%) (50 Hz ± 0.1%)	
1.5	Input voltage - DC	
1.6	Synchronization (inv. phase locked with main) in percentage	
1.7	Synchronization manually adjustable in steps of	
1.8	Allowable unbalance between phases (for 3 Phases only)	
1.9	Harmonics distortion for linear & non-linear loads	
1.10	Mode of operation	Dual/Parallel Redundant with static bypass as specified in SOR /Design basis/Block diagram
1.11	Dynamic Responses at following conditions a) ± 50% step load (for parallel redundant UPS) b) ± 100% step load (for hot standby and single UPS system). c) Power supply interruption and restoration. d) Load Transferred to bypass line e) When one inv. gets faulty and load transferred to healthy inv. (for parallel redundant UPS)	
1.12	Recovery time to reach steady state after above disturbance (not more than 100m Sec)	
1.13	Overload capacity (125% minimum for 10 min. 150% minimum for 1 min.)	
1.14	Short circuit capacity and duration (in % and m sec.)	

1.15	Noise Level (dB at 1 m) • <65 dB at full Load from 1 mtr distance (for UPS of rating 5kVA, 7.5kVA & 10kVA) • <75 dB at full Load from 1 mtr distance (for UPS of rating 15kVA & 20kVA)	
1.16	Efficiency at 100%/75%/50% loads (not less than 85% at 100% load)	
1.17	Type of control circuit	
1.18	Out put voltage & phase angle (for 3 Phase only) a) For 30% unbalance load b) For 40% unbalance load c) For 50% unbalance load d) For 100% unbalance load	
1.19	Crest Factors	
2.0	**STATIC SWITCHES**	
2.1	Nos. of static switches in each set	
2.2	Current rating at specified ambient	
2.3	Transfer time (m sec.) a) Synchronized mode (not more than 4msec) b) Unsynchronized mode (not more than 20msec)	
3.0	**BATTERY CHARGER**	
3.1	Rating (Amp.) / MAKE (**Enclose back up calculation).**	
3.2	Type of charger (Basic configuration)	
3.3	Output volt under float/boost charging condition	
3.4	Volt. Accuracy under specified input (± 1%)	
3.5	Max. Ripple content on DC side (% RMS) (not more than 2% without battery & 1% with battery connected)	
3.6	Efficiency at 100%/75%/50 % of load	
3.7	Mode of Change over from float to boost and vice-versa	
4.0	**BATTERY**	
4.1	Make	

4.2	Type (**Enclose catalogue)**	
4.3	AH rating **(Enclose back up calculation)**	
4.4	End cell voltage at specified discharge rate (V/ cell)	
4.5	Output (Nominal) volts	
4.6	Nos. of battery banks	
4.7	Nos. of cells in each banks	
4.8	Battery charging requirements (V/ cell) a) Volts/Cell/Nominal b) Float c) Boost	
4.9	Voltage variation from fully charged battery to discharged battery (volts)	
4.10	Charging time (Hrs.)	
4.11	Max. Permissible ripple content (% RMS)	
4.12	Overall dimension (L*W*H)	
4.13	Container type	
4.14	Accessories for battery as per specification included	Cell testing Voltmeter, Pair of Gloves, Insulated Spanner, Extra Electrolyte, Hydrometer, Thermometer etc.
4.15	Type/Formation of battery stand	
5.0	**MANUAL TRANSFER DEVICES**	
5.1	Rating (Amp.)	.
5.2	Make/Type	
6.0	**STEP DOWN BYPASS TRANSFORMER WITH SOLID STATE VOLTAGE STABILISER**	
6.1	Make/type	
6.2	Rating and Voltage ratio	
6.3	Accuracy of stabilizer (not more than ± 2%)	
6.4	Type of control (Solid state)	
6.5	Type of cooling	Natural
7.0	**AC DISTRIBUTION BOARD**	
7.1	Nos. of feeder/rating	
7.2	Cable entry from (Bottom)	

7.3	Max. Rating of outgoing feeders possible for fault clearance by UPS with and without supply back up (as percentage of UPS rating) not less than 25% a) With fast acting semi conducting fuses	
8.0	Indications and Alarm	
9.0	Metering	
10.0	**UPS Dimension** (L x W x H) except Battery: (Including inverter, charger, rectifier, bypass stabilizer, ACDB etc.)	
11.0	**OVERALL EFFICIENCY OF UPS SYSTEM**	
11.1	Ratio of output load to input drawn from mains when inverters are on and synchronized with bypass. a) At 100% load b) At 75% load c) At 50% load	
12.0	**RELIABILITY** a) Safety factor used for selecting electronic components/ other electrical components (not less than 200%/ 125% respectively) b) MTBF / MTFR c) Availability factor	
13.0	DEGREE OF PROTECTION OF THE PANEL (Minimum IP – 31)	
14.0	**Heat loss** for total system (W)	
15.0	**Potential free contracts** (for duplicating of fault status in remote panel).	
16.0	**Fault status** shall be compatible to hook-up with Owner's PC through Ethernet/ preferably RS 485 interface (To be decided during detailed engineering).	

ANNEXURE- II (B)

TECHNICAL DATA FROM MANUFACTURER

1.0	2x100% RECTIFIER UNITS	
1.1	Mains Input	
	a) Voltage & Frequency	415 V (+) 10% & (-) 15%, TPN, 50 Hz ± 5% or Power supply details mentioned in SOR or 230V AC single phase (voltage range-160V AC to 270V AC) or 230V ± 1% AC from UPS. (Rectifiers 24V & 48V may be fed from UPS AC output).
	b) Input harmonics (max.) at full load.	5% RMS (Voltage)
1.2	**Out put details**	
1.2.1	**Rectifier**	
	a) Voltage / Wattage	24 VDC , Rating as per SOR with input variation of +/-10%. Feeder details : **Rectifier Input** - 32A **Rectifier Output**- As per load & Voltage rating **DCDB Outgoing feeders** – 16A DP- 10Nos., 20A DP- 10Nos. & 32A DP- 06 Nos Actual Feeder nos. mentioned is Min.Actual shall be decided during detailed engineering.
		(-) 48 V DC, rating as per SOR with input variation of +/-10%. **Rectifier Input** - 32A **Rectifier Output**- As per load & Voltage rating **DCDB Outgoing feeders** – 16A DP- 10Nos., 20A DP- 10Nos. & 32A DP- 02 Nos Actual Feeder nos. mentioned is Min.Actual shall be decided during

		detailed engineering.
	b) Method of Voltage /Current Control	Static
1.2.2	**Load Bus**	
	a) Voltage Regulation from Full load to no load (for mains variation of ± 10 %)	± 5%
	b) Ripple Content (<30 mV)	
	c) Rating of Double pole MCB and fuses for DCDB	(DP MCB's with semiconductor fuses and DC bus for 4 outgoing feeders)
1.3	Efficiency of Rectifier (at 50%, 75%, 100% load)	
1.4	Power Factor of Rectifier (at all load)	0.6 to 0.7 (lag)
1.5	**Annunciator details**	
	a) Audio – Visual	DC over voltage Rectifier Failure Load C.B. Trip
	b) Push buttons	Acknowledge, reset
	c) Remote	One no. potential free common alarm annunciation contact.
1.6	Indication Lamps	AC Power ON, Rectifier ON
1.7	Meters	A.C. input ammeter and voltmeter. Output ammeter and voltmeter.
1.8	MTBF (Hrs.)	60,000 Hrs.
1.9	MTTR (Hrs.)	4 Hrs. (Approx.)
1.10	PTRV (Peak Transient reverse voltage)	600 V on AC side 200 V on DC side
1.11	**Construction Details**	
	a) Type of Cooling	Natural
	b) Cable entry	Same as UPS Panel
	c) Access	Same as UPS Panel
	d) Painting	Same as UPS Panel
	e) Degree of Protection	Same as UPS Panel

1.12	Safety Factor	2

ANNEXURE - III

CHECK LIST (To be submit along with Datasheets)

Sl. No	Description	REMARKS
1	Deviation from specification	
2	Charger sizing calculation enclosed	
3	Battery sizing calculation enclosed	
4	Battery catalogue enclosed	
5	UPS Panel Catalogue enclosed	
6	Confirm compliance to Block diagram	
7	Confirm Inspection for UPS and battery as per specification.	
8	Dimension for UPS Panel, rectifier and Battery Bank enclosed.	
9	Break up for two years operation & maintenance spares enclosed for UPS & Rectifier	

ANNEXURE - IV

LIST OF TWO YEAR OPERATION & MAINTENANCE SPARES

Sl No.	Description	UOM	Quantity	
			Odisha	Andhra Pradesh
1	IGBT (5 KVA)	Sets	2	-
2	IGBT (7.5 KVA)	Sets	-	1
3	IGBT (10 KVA)	Sets	-	1
4	Rectifier/ Charger Card*	Sets	2	1
5	Inverter Card*	Sets	2	1
6	Power supply card*	Sets	2	1
7	DC-DC Converter card*	Sets	2	1
8	MCB's & MCCB's (consist of one no. of each rating MCB & MCCB)**	Sets	2	1
9	Fuse of all ratings**	Sets	2	1
10	Cooling fan	Nos.	4	2

(1) * 1 Set=One of card of each rating/type
(2) ** 1 Set= 10% of each rating (minimum one number)

Note: Prices of 02 year O&M spares are inclusive of prices quoted by the Bidder.

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REV. : 4
Edition : 1

DATA SHEET

FOR

UN-INTERRUPTED POWER SUPPLY (UPS) SYSTEM

SPECIFICATION NO.- MEC/DS/05/E9/071A

(OIL & GAS SBU)
MECON LIMITED
DELHI 110092

ANNEXURE-I

PURCHASER'S DATA FOR UPS

1.0 INPUT POWER SUPPLY		
1.1	Voltage/freq./ phase:	415 V (+) 10% & (-)15%, TPN, 50 Hz ± 5% with healthy Phase selector switch. As per SOR
1.2	System fault level	10 kA for 1 Sec
2.0 SITE CONDITION		
2.1	Design Maximum / Minimum temperature	50^0C/2^0C
2.2	Max. Relative Humidity	95%
2.3	Altitude	Below 1000.0 M MSL
3.0 OUT PUT REQUIREMENT		
3.1	Voltage/ Phase	230V ± 1% AC, Single phase 2 wire
3.2	Output waveform & frequency	Pure Sinusoidal Wave
		50 Hz ± 0.1%
		Voltage distortion (THD): Less than 3% for linear loads & Less than 5% for non linear loads.
4.0 SYSTEM REQUIREMENTS		
4.1	Rating KVA	**As per SOR**
4.2	Type of inverter	The inverter circuit should be IGBT based, fully microprocessor controlled with PWM Technology or Latest proven technology
4.3	Overload capacity	125% of the rated output for 10 minutes & 150% for 1 minute.
4.4	Mode of operation	Single UPS as specified in SOR/Design basis/Block diagram
4.5	Inverter efficiency	>85% at 100% of load and >80% at 25% of load
4.6	Installation	Floor Mounted
4.7	Type of enclosure	Minimum IP-31
4.8	External Cable Connection	From Bottom
4.9	Internal protection	All live parts shrouded
4.10	Earthing	Doubly Earthed (Two distinct terminals to be made available)
4.11	Cooling	Forced ventilation with fans

4.12	Noise Level	• <65 dB at full Load from 1 mtr distance (for UPS of rating 5kVA, 7.5kVA & 10kVA) • <75 dB at full Load from 1 mtr distance (for UPS of rating 15kVA & 20kVA)
4.13	Crest Factor	≥3:1
4.14	Input Power Factor	> 0.95
4.15	Load Power Factor	0.8 (with variation between 0.6 to 1.0)
4.16	Overall efficiency	> 80%
4.17	Harmonics	As per IEEE 519 (Total demand distortion not more than 5.0%)
5.0 Rectifier/Charger		
5.1	Input voltage	230V AC single phase (voltage range-160V AC to 270V AC) (As per SOR).
5.2	Automatic phase selection device	As per SOR
5.3	Output DC voltage/Load	**As per Manufacturer Design**
5.4	Input Power factor	> 0.95 at rated load
5.5	Input current THD (Total Harmonic Distortion) at nominal load	<= 5 %
5.6	Overload Capability	125% minimum for 10 min. 150% minimum for 1 min
5.7	Inrush current	Limited by soft-start circuit
5.8	Output voltage tolerance	+/- 1%
5.9	DC voltage ripple	<1% With battery connected <2% Without battery connected
5.10	Rectifier	IGBT based
5.11	Filter	Input side line filter
5.12	Harmonics	As per IEEE-519 (Voltage THD <5%, largest single voltage harmonics <3%, Input Current THDi <5%
5.13	Charging	Automatic Float and Boost charging (selection as per battery charging state (voltage level))
6.0 Bypass		
6.1	Manual/Maintenance Bypass	Shall be provided
6.2	Overload on bypass	125% minimum for 10 min. 150% minimum for 1 min.

7.0 Battery Bank		
7.1	Type of Battery	**As per SOR**
7.2	Battery Arrangement	**1 X 100%**
7.3	i) Battery end cell voltage ii) Battery stand formation iii) Battery back up time iv) De-rating factor	As per specification (clause no. 3.5) As per battery manufacturer As per SOR (i) Ageing -- 0.8 (ii) State of Charge -- 0.88 (iii) Temp. Correction -- 0.95 The rectifier/charger output current & voltage shall be limited to the battery supplier's recommendation.
8.0 Alarms, Indications and LCD Display		
8.1	Single line Power Flow Diagram (Mimic diagram) with LED indications of UPS status (i.e. Mains present, Battery charging & discharging, Low battery Voltage and unit on bypass).	
8.2	Digital panel Meter with LCD display (touch screen / touch pad) shall be provided for monitoring viz.	a) Input AC Voltage, current, frequency b) Output AC Voltage, current, frequency. c) Battery current and voltage d) Total run time e) Mains ON/OFF/TRIP, Mains Over/Under voltage, Phase fail f) Inverter ON/OFF, Inverter Over/Under voltage, inverter overload, over heat & load in % on inverter. g) Battery voltage low, Battery AH in % h) Battery Operation Boost Charge, Float Charge with of status - "in charge" or "discharge" i) Load on bypass or inverter. Detailed UPS Status with Operation/faults history
8.3	Audible Alarms With LCD Display-	a) Mains Failure b) Battery Low c) UPS fault (Continuous) d) Inverter Under-voltage e) Over Temperature (Continuous) f) Inverter Overload (Continuous)
9.0 Protective Features		
9.1	Input	Mains Over voltage, under voltage, phase failure
9.2	Inverter	Over voltage, short circuit, overload, over temperature

9.3	Battery	Under voltage at battery terminal, Battery over charge, Battery Over current
9.4	Rectifier & Battery charger	Maximum current limiting Over temp. Trip Boost charging and float charging current limiting with back up protection against over charging.
10.0 Distribution boxes		
10.1	Distribution Board Details	**(As per tender drawings / SOR)** **(1)ACDB 230V, Single Phase (1 No.) :** Incomer: 32A MCB (As per UPS capacity 2KVA. Outgoing: Combination of DP MCB's : 10A MCB DP-5 nos., 6A MCB-5 nos. (The rating of above-mentioned feeders may change during detail engineering; Bidder shall provide all required feeders as per requirement without any financial implications.)
11.0	**UPS communication**	**Ethernet / preferably Modbus RS 485** **(To be decided during detailed engineering)**
12.0	**Selector switch**	**For Auto manual switch for Float and boost selection**

ANNEXURE-II

TECHNICAL DATA FROM MANUFACTURER
(To be filled up by the Tenderer)

1.0	**INVERTER**	
1.1	Manufacturer's Model No. (**Enclose catalogue**)	
1.2	Rating (at specified ambient) / no. of phases	
1.3	Applicable codes/standards	
1.4	Steady state output volt/freq (230 V ± 1%) (50 Hz ± 0.1%)	
1.5	Input voltage - DC	
1.6	Synchronization (inv. phase locked with main) in percentage	
1.7	Synchronization manually adjustable in steps of	
1.8	Deleted	
1.9	Harmonics distortion for linear & non-linear loads	
1.10	Mode of operation	Single UPS with manual static bypass as specified in SOR /Design basis/Block diagram.
1.11	Deleted	
1.12	Recovery time to reach steady state after above disturbance (not more than 100m Sec)	
1.13	Overload capacity (125% minimum for 10 min. 150% minimum for 1 min.)	
1.14	Short circuit capacity and duration (in % and m sec.)	
1.15	Noise Level (dB at 1 m) • <65 dB at full Load from 1 mtr distance (for UPS of rating 5kVA, 7.5kVA & 10kVA) • <75 dB at full Load from 1 mtr distance (for UPS of rating 15kVA & 20kVA)	
1.16	Efficiency at 100%/75%/50% loads (not less than	

	85% at 100% load)	
1.17	Type of control circuit	
1.18	Out put voltage & phase angle (for 3 Phase only) a) For 30% unbalance load b) For 40% unbalance load c) For 50% unbalance load d) For 100% unbalance load	
1.19	Crest Factors	
2.0	**Deleted**	
3.0	**BATTERY CHARGER**	
3.1	Rating (Amp.) / MAKE (**Enclose back up calculation).**	
3.2	Type of charger (Basic configuration)	
3.3	Output volt under float/boost charging condition	
3.4	Volt. Accuracy under specified input (± 1%)	
3.5	Max. Ripple content on DC side (% RMS) (not more than 2% without battery & 1% with battery connected)	
3.6	Efficiency at 100%/75%/50 % of load	
3.7	Mode of Change over from float to boost and vice-versa	
4.0	**BATTERY**	
4.1	Make	
4.2	Type (**Enclose catalogue)**	
4.3	AH rating **(Enclose back up calculation)**	
4.4	End cell voltage at specified discharge rate (V/ cell)	
4.5	Output (Nominal) volts	
4.6	Nos. of battery banks	
4.7	Nos. of cells in each banks	
4.8	Battery charging requirements (V/ cell) a) Volts/Cell/Nominal b) Float c) Boost	

4.9	Voltage variation from fully charged battery to discharged battery (volts)	
4.10	Charging time (Hrs.)	
4.11	Max. Permissible ripple content (% RMS)	
4.12	Overall dimension (L*W*H)	
4.13	Container type	
4.14	Accessories for battery as per specification included	Cell testing Voltmeter, Pair of Gloves, Insulated Spanner, Extra Electrolyte, Hydrometer, Thermometer etc.
4.15	Type/Formation of battery stand	
5.0	**MANUAL TRANSFER DEVICES**	
5.1	Rating (Amp.)	.
5.2	Make/Type	
6.0	**Deleted**	
7.0	**AC DISTRIBUTION BOARD**	
7.1	Nos. of feeder/rating	
7.2	Cable entry from (Bottom)	
7.3	Max. Rating of outgoing feeders possible for fault clearance by UPS with and without supply back up (as percentage of UPS rating) not less than 25% a) With fast acting semi conducting fuses	
8.0	Indications and Alarm	
9.0	Metering	
10.0	**UPS Dimension** (L x W x H) except Battery: (Including inverter, charger, rectifier, bypass stabilizer, ACDB etc.)	
11.0	**OVERALL EFFICIENCY OF UPS SYSTEM**	

11.1	Ratio of output load to input drawn from mains when inverters are on and synchronized with bypass. a) At 100% load a) At 75% load b) At 50% load	
12.0	**RELIABILITY** a) Safety factor used for selecting electronic components/ other electrical components (not less than 200%/ 125% respectively) b) MTBF / MTFR c) Availability factor	
13.0	DEGREE OF PROTECTION OF THE PANEL (Minimum IP – 31)	
14.0	**Heat loss** for total system (W)	
15.0	**Potential free contracts** (for duplicating of fault status in remote panel).	
16.0	**Fault status** shall be compatible to hook-up with Owner's PC through Ethernet/ preferably RS 485 interface (To be decided during detailed engineering).	

ANNEXURE - IV

LIST OF TWO-YEAR OPERATION & MAINTENANCE SPARES

Sl No.	Description	UOM	Quantity
			Each City
1	IGBT (2 KVA)	Sets	1
2	Rectifier/ Charger Card*	Sets	1
3	Inverter Card*	Sets	1
4	Power supply card*	Sets	1
5	DC-DC Converter card*	Sets	1
6	MCB's & MCCB's (consist of one no. of each rating MCB & MCCB) **	Sets	2
7	Fuse of all ratings**	Sets	2
8	Cooling fan	Nos.	2

(1) * 1 Set=One of card of each rating/type
(2) ** 1 Set= 10% of each rating (minimum one number)

Note: Prices of 02-year O&M spares are inclusive of prices quoted by the Bidder.

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	DULIAJAN FEEDER LINE	DOC. NO.	MEC/DS/05/E9/73
	DATA SHEET FOR AUTOMATIC VOLTAGE REGULATOR	REV. NO.	00

Sl No	DESCRIPTION	DESIGN DATA	VENDOR DATA
1.00	**GENERAL**		
1.01	Tag no.	*	
1.02	Manufacturer.	*	
1.03	Hazardous area classification	Safe area / Hazardous	
1.04	Installation	Outdoor	
1.05	Standards / Codes	IS 9815	
1.06	Overall Dimensions (LxWxH)	*	
2.00	**SITE CONDITIONS**		
2.01	Ambient temperature	50 Deg C	
2.02	Design temperature	55 Deg C	
2.03	Relative humidity	95%	
2.04	Special conditions (Tropicalisation, etc..)	Required	
2.05	Altitude above mean sea level	<1000 m	
3.00	**SYSTEM DETAILS**		
3.01	Input voltage range	320 to 580V AC (3Ph+N)	
3.02	Output voltage	415V ±1% AC (3Ph+N)	
3.03	Rated frequency	50Hz ±5%	
3.04	Fault level	30kA for 1 Second	
3.05	System grounding	Solid Earthed	
3.06	Load Power factor range	0.7 lag to 1.0	
3.07	Load Type	Unbalanced Load	
4.00	**TECHNICAL PARTICULARS**		
4.01	Rated Output	As per SOR	
4.02	Winding Material	Copper	
4.03	Control	Digital Microprocessor based	
4.04	Speed of Correction	*	
4.05	Response Time	*	
4.06	Waveform	Sinusoidal	
4.07	Buck Boost Transformer		
4.08	a. Ratio	*	
4.09	b. Rating	*	
4.10	c. Winding	Copper	
4.11	d. Qty	*	
4.12	e. Insulation Class	Class H	
4.13	Auto Transformer		
4.14	a. Ratio	*	
4.15	b. Rating	*	
4.16	c. Winding	Copper	
4.17	d. Number of tapings	*	
4.18	e. Qty	*	
4.19	f. Insulation Class	Class H	
4.20	Servo Motor		
4.21	a. Rated Voltage (AC/DC)	*	
4.22	b. Rating in kW	*	
4.23	c. Winding	Copper	
4.24	d. Qty	*	
4.25	e. RPM	*	
4.26	f. Rated Torque	*	
4.27	g. Insulation Class	*	
4.28	h. Forward / Reverse Stalling Current	*	
4.29	i. Locked Rotor Withstand Time	*	
4.30	j. Manufacturer	*	
4.31	Efficiency of the system	>98%±0.5%	
4.32	Output Voltage Adjustment	±5%	
4.33	Bypass Arrangement	Required for bypassing the input supply to output and Isolating the Servo Stabilizer for maintenance / repair	
4.34	Mounting	Floor Mounted	
4.35	Cable Connection	Bottom	
4.36	Incomer cable Nos. & size with details	During Detail Engineering	

4.37	Outgoing cable Nos. & size with details	During Detail Engineering	
4.38	Nature of Cooling	Air Natural	
4.39	Insulation Class	Class H	
4.40	Operating Mode	Automatic & Manual	
4.41	Degree of protection	IP 52	
4.42	Duty Class	Continuous	
4.43	Weight of Overall Unit	*	
4.44	Paint shade	RAL 7032	
4.45	Enclosure material	CRCA	
4.46	Thickness of Sheet steel		
4.47	a. Frame (mm)	2	
4.48	b. Doors (mm)	1.6	
4.49	c. Covers (mm)	1.6	
4.50	c. Gland Plate (mm)	3	
4.51	Clear space required on top	*	
4.52	Clear Space Required on rear	*	
4.53	Clear Space Required on sides	*	
4.54	Earth Terminal	Minimum 2 Required	
4.55	No load loss at minimum rated input voltage	*	
4.56	No load loss at maximum rated input voltage	*	
4.57	Full load loss at minimum rated input voltage	*	
4.58	Full load loss at maximum rated input voltage	*	
4.59	Short Time Overload Capacity	110% for 5 Minutes	
4.60		120% for 1 Minutes	
5.00	**Metering**		
5.01	Incomer Ammeter	Required (Digital Type)	
5.02	Incomer Voltmeter	Required (Digital Type)	
5.03	Outgoing Ammeter	Required (Digital Type)	
5.04	Outgoing Voltmeter	Required (Digital Type)	
5.05	PF Meter	Required (Digital Type)	
6.00	**Indication**		
6.01	RYB Indication	Required	
6.02	Incomer MCCB On / OFF / Trip	Required	
6.03	Outgoing MCCB On / OFF / Trip	Required	
6.04	Output Hi-Cut Off, Output Low Cut off	Required	
6.05	Under Voltage	Required	
6.06	Over Voltage	Required	
6.07	Input Phase Reversal Indication	Required	
6.08	Input single phasing	Required	
6.09	Unit over temperature	Required	
7.00	**Protection**		
7.01	Input MCCB with OC, EF and SC Protection	MCCB with adjustable Overload, SC & Earth fault required (LSIG)	
7.02	Output MCCB with OC, EF and SC Protection		
7.03	Manual Bypass Switch	Required	
7.04	Output High Cut off	Required	
7.05	Output Low Cut off	Required	
7.06	Phase Reverse Protection	Required	
7.07	Input Single Phasing Protection with By passing	Required	
7.08	Over Load Protection	Required	
7.09	Spike & Surge Protection	Required	
8.00	**Alarm**		
8.01	Alarm on Under Voltage	Required	
8.02	Alarm on Over Voltage	Required	
8.03	Alarm on Over Load	Required	
NOTES:			
1.00	(*) Data to be filled by supplier with its bid in the supplier data column, those data shall be in accordance with standard specification.		
2.00	The rating mentioned in the Bid documents are minimum. Contractor shall finalize the actual size during detail engineering.		
3.00	All Ammeter / Voltmeter shall be with Class 1.0 Accuracy. Metering & Protection CT shall have accuracy class of CL:1, 5P10 respectively.		
4.00	Normally open (NO) potential-free contacts shall be wired up to terminal strip for connection to SCADA interface for common Stabilizer fault.		
5.00	Overload protection shall be provided for Electronic cards		

	DULIAJAN FEEDER LINE	DOC NO. -MEC/DS/05/E9/074
	DATA SHEET FOR EMERGENCY DIESEL GENERATOR	REV.NO. - 00

Sl.No.	Description	Design Data
1.00	**GENERAL**	
1.01	*Tag numbers*	*C*
1.02	*Installation*	*Outdoor (Inside Acoustic enclosure)*
1.03	*Ventilation*	☐ *Adequate* ☐ *Inadequate*
1.04	*Mounting*	*C*
1.05	*Standard specification*	*C*
1.06	*Application*	☒ *Standby / Emergency operation* ☐ *With black start facility* ☐ *Base load power generation*
1.07	*Hazardous area classification (as per IEC)*	*Non-Hazardous area*
1.08	*Noise Level (dB)*	*Less than 75 db (A) at 1 M from Acoustic enclosure*
2.00	**SERVICE AND ENVIRONMENTAL CONDITIONS**	
2.01	*Max. Ambient temp.*	*50 Deg.C*
2.02	*Min. Ambient temp.*	*5 Deg.C*
2.03	*Design ambient temp.*	*55 Deg.C*
2.04	*Relative humidity*	*95%*
2.05	*Altitude*	*<1000M*
2.05	*Environment*	*Dusty & Corrosive*
3.00	**GENERAL AND ELECTRICAL DATA**	
3.01	*Duty*	*Standby / Emergency operation*
3.02	*Rated output voltage*	*415V ±1%*
3.03	*Rated output frequency*	*50Hz ±0.5%*
3.04	*Power factor*	*0.8*
3.05	*Insulation class*	☒ *Class-H*
3.06	*Temp. Rise allowed*	☒ *Class-F*
3.07	*Generator neutral earthing*	☒ *Solidly grounded* ☐ *Grounded*
3.08	*Type of Termination*	*Cables*
3.09	*CTs/PTs*	*Required*
3.10	*Generator neutral CT details*	
3.11	*a. CT ratio*	*During Detail Eng.*
3.12	*b. Protection class*	*5P10*
3.13	*c. VA burden*	*During Detail Eng*
3.14	*Fault Current Withstand Capacity*	*25kA for 1 Second*
4.00	**Metering CT details**	
4.01	*a. CT ratio*	*During Detail Eng.*
4.02	*b. Class*	*1*
4.03	*c. VA burden*	*During Detail Eng.*
5.00	**Metering VT details**	
5.01	*a. Voltage ratio*	*C*
5.02	*b. Class*	*1*
5.03	*c. VA burden*	*C*
6.00	**Generator control panel**	*Required*
6.01	*Type of mounting*	*C*
6.02	*Access*	*Front*
6.03	*Generator control panel*	*Required*
6.04	*Starting battery and battery charger*	*Required*
7.00	*Type of starting battery*	*Lead acid*
8.00	**INDICATION AND METERING**	

Sl.No.	Description	Design Data
8.01	Ammeter with selector switch	Yes
8.02	Voltmeter with selector switch	Yes
8.03	kW METER	Yes
8.04	P.F. meter	Yes
8.05	Frequency meter	Yes
8.06	Hour run meter (As per local CEIG Guidelines)	Yes
8.07	kWH meter (As per local CEIG Guidelines)	Yes
8.08	Open/ closed/trip status lamps for gen. Breaker	Yes
8.09	Set of alarm indications	Yes
8.10	Set of shutdown annunciator / reset push buttons	Yes
8.11	Heater 'on' indication	Yes
8.12	Generator on Auto/ Manual/ Test indication	Yes
9.00	**PROTECTION RELAYS**	
9.01	96 Trip circuit supervisor relay	☒ Yes ☐ No
9.02	26 Stator winding temperature relay	☒ Yes ☐ No
9.03	27 Under-voltage relay	☒ Yes ☐ No
9.04	32 Reverse power relay	☒ Yes ☐ No
9.05	51/51N IDMT overcurrent / Earth fault relay	☒ Yes ☐ No
9.06	40 Loss of excitation relay	☒ Yes ☐ No
9.07	46 Negative phase sequence relay	☒ Yes ☐ No
9.08	51V Voltage restrained over-current relay	☒ Yes ☐ No
9.09	51G Star point un-restricted earth fault relay	☒ Yes ☐ No
9.10	58 Excitation diode failure relay	☒ Yes ☐ No
9.11	59 Over-voltage relay	☒ Yes ☐ No
9.12	64 Restricted earth fault relay	☐ Yes No
9.13	81 Under and over frequency relay	☒ Yes ☐ No
9.14	87 Generator differential current relay	☐ Yes No
9.15	67 Earth fault directional relay	☐ Yes No
9.16	49 Thermal overload relay	☒ Yes ☐ No
10.00	**CONTROL DEVICES**	
10.01	Emergency shutdown push button with guarding	☒ Yes ☐ No
10.02	Auto / manual selector switch for regulation	☒ Yes ☐ No
10.03	Voltage raise- lower push button with potentio meter	☒ Yes ☐ No
10.04	Frequency raise-lower push button with potentio meter	☒ Yes ☐ No
10.05	Local / off / remote selector switches	☒ Yes ☐ No
10.01	Generator start / stop push buttons	☒ Yes ☐ No
11.	**EQUIPMENT DETAILS**	
A.	**ALTERNATOR**	
1.0	Make (Shall be selected from approved vendor list enclosed elsewhere in the tender)	C
2.0	Excitation Type Brushless, self- regulated	C
3.0	Governing Specifications	IS : 4722
4.0	Full load output in kVA	40 kVA (Tentative Min. Rating as per the Single Line Diagram/ Scope of Work). Finalized during detail engineering
5.0	Output voltage level	415V ±1%
6.0	Ingress protection class of enclosure	IP 23
7.0	Speed/ Frequency	1500 RPM, 50Hz ±0.5%
8.0	No. of phases	3 phase, 4W system
9.0	Is neutral brought out separately?	Yes, to be provided
10.0	Current carrying capacity of winding	* Amp.
11.0	Percentage imbalance permissible (As per IS: 4722) At Full load Other loads	C
12.0	Short time overload at: 110 % load 150% load	1 Hour in 12 hours 30 secs

Sl.No.	Description	Design Data
13.0	Efficiency At Rated P.F. 100 % load 75 % load 50 % load	C
14.0	Local isolation of alternator output	C A, FP, MCCB with O/C & S/C release inside acoustic enclosure
15.0	Excitation method	C
16.0	Excitation amps at full load	C
17.0	Excitation voltage	C
18.0	Exciter type	C
19.0	Specification for exciter	C
20.0	Fault level	C
21.0	Reactance (Saturated Values in %)	Saturated Values: Xd = *%, Xd' = *%, Xd" = *%
22.0	Three phase sustained SC current	C
23.0	Transient voltage dip for any addition of load upto and including 90% load	<= 15 %
24.0	AVR make, type & response time	C
25.0	Head room needed for lifting/servicing	C
26.0	Weight of alternator	C
27.0	Direction of rotation	C
28.0	Details of other major unit assembled	C
29.0	Rating of each space heater (in Watt)	C
B.	**ENGINE**	
30.0	Model No.	C
31.0		C
	Manufacturer ((Shall be selected from approved vendor list enclosed elsewhere in the tender)	
32.0	No. of Cylinders	C
33.0	Bore	C
34.0	Stroke	C
35.0	Rated RPM	C
36.0	Compression Ratio	C
37.0	Continuous HP at Max. Continuous rated RPM	C
38.0	Absorbed HP & RPM at site	C
39.0	Intermittent HP (1 Hr. in 12 Hrs.)	C
40.0	Continuous Max. rated RPM	C
41.0	Normal working Range (RPM)	C
42.0	BMEP – Continuous rating	C
43.0	Rotation (standard/counter clockwise)	C
44.0	Mechanical Efficiency at rated HP & rated RPM	C
45.0	Thermal Efficiency at rated HP & rated RPM	C
46.0	Type of Governor	C
47.0	Weight of the Engine without accessories (Tons)	C
48.0	Power Weight Ratio	C
C.	**FUEL SYSTEM**	
49.0	Specific Fuel Consumption at rated HP & rated RPM	C
50.0	Fuel Consumption @ 3/4 Load	C
51.0	Fuel Consumption @ 1/2 Load	C
52.0	Fuel Consumption @ No Load	C
D.	**LUBRICATION**	
53.0	Lube Oil Sump Capacity	C
54.0	Lube Oil Pressure at rated RPM	C
55.0	Lube Oil Consumption (at rated HP & rated RPM Subject to tolerance of 10%)	C
56.0	Lube oil Pumps	C

Sl.No.	Description	Design Data
E.	**COOLING SYSTEM**	
57.0	*Normal Jacket water outlet Temperature*	*C*
58.0	*Normal Lube oil Outlet Temperature*	*C*
59.0	*Engine Jacket water system Volume*	*C*
60.0	*Jacket water Pump Flow at rated RPM*	*C*
61.0	*Cooling system details*	*C*
F.	**EXHAUST SYSTEM**	
62.0	*Exhaust Gas temp. at stack*	*C*
63.0	*Exhaust outlet Bore at adopter*	*C*
64.0	*Smoke level*	*C*
65.0	*Exhaust system details*	*C*
G.	**OTHER DETAILS**	
66.0	*Fly Wheel details*	*C*
67.0	*Damper details*	*C*
68.0	*Flexible spacer Coupling details (between Engine and gear box, Gear box and Pump)*	*C*
H.	**MAINTENANCE FREE LEAD ACID BATTERY / CHARGER**	
69.0	*Make, AH Capacity, Voltage, Number*	*C*
70.0	*Whether capable for 3 consecutive start*	*C*
71.0	*Charger Make*	*C*
72.0	*Charger float Voltage & Current*	*C*
73.0	*Boost voltage & current*	*C*
74.0	*External Battery Charging Provision when DG is off*	*Required*
I.	**FUEL TANK DETAILS**	
75.0	*Capacity*	*C*
76.0	*Whether provided at the base or separate*	*C*
77.0	*Explosion Proof level switches with potential free contacts for alarm and tripping – High level, low level, low low level*	*C*
78.0	*Fuel level Indicator provided*	*C*
J.	**ENGINE CONTROLLER**	
79.0	*Make & Model*	*C*
80.0	*DG operation in individual*	*C*
81.0	*IP class (IP-55) of engine controller*	*C*
82.0	*Color shade & Painting*	*C*
83.0	*Harmonic Content (%THD)*	*C*
84.0	*Over speed*	*C*
85.0	*Generator Local panel IP Rating*	*IP 55 Minimum*
86.0	*Generator Local panel Color*	*RAL 7032*
87.0	*Generator Local panel Dimension*	*C*

NOTES:

1	*C: Bidder to furnish data/details.*
2	*DG Shall be installed as per Local CEIG Guidelines*
3	*DG Shall be provided with provision of starting from Local as well as remote through SCADA in case of main supply*
4	*DG shall be sized to withstand the momentary Voltage drop during starting of Highest rating motor*
5	*Vent stack height shal be inline with CPCB/GPCB/MoEF/ Environmental protection act/guidelines. Contractor to*

Annexure-VII
to
Particular Job Specification
(FIRE PROTECTION WORKS)

PARTICULAR JOB SPECIFICATION FOR FIRE DETECTION & ALARM SYSTEM

1.0 INTRODUCTION

The job includes Design, Engineering, Supply, Inspection, Transportation, Transit Insurance, handling, loading, unloading, packing, transporting equipment / accessories to Owner's/ Contractor's own storage yard, assistance in installation, testing & commissioning of fire detection and alarm system along with accessories and spares required for FAS

For fire protection System the requirements of OISD, PNGRB, IEC, NFPA, IS rules, whichever is more stringent shall be followed.

1.1 Intent of Specification

The intent of the specification is to cover Design, Engineering, Supply, Inspection, Transportation, Transit Insurance, handling, loading, unloading, packing, transporting equipment / accessories to Owner's/ Contractor's own storage yard, assistance in installation, testing & commissioning and guaranteed performance of fire detection and alarm system along with accessories and spares required for FAS of the following and as outlined in various chapters of the technical specification:

1.1 The contractor shall include all instrumentation, electrics, supports, inserts, accessories, Gaskets etc. required for complete functional and operational working of the Fire Alarm system as a whole.

1.2 The execution of the system shall be made at site at various locations of the project as elaborated elsewhere in the specification. The materials shall be delivered at respective sites as per engineering quantity, SOR & scope defined elsewhere.

1.3 Any additional item/ component that are not specifically mentioned in the specification but are required to make the system/ equipment complete in all respects for safe operation and guaranteed performance shall be under the scope of this specification without any financial implication to the company.

1.4 The scope of work and services to be rendered by the Tenderer for Fire Alarm System shall include but shall not be limited to the following activities.

i. Design, Engineering, Supply, Inspection, Transportation, Transit Insurance, handling, loading, unloading, packing, transporting equipment / accessories to Owner's/ Contractor's own storage yard, assistance in installation, testing & commissioning and guaranteed performance of fire detection and alarm system, sub-systems and integrated systems as

described above and also covered under this tendering specification.

ii. Miscellaneous materials and services, if not otherwise specifically asked for, shall include the following:

- Constructing site office, covered store, open storage at designated place including supply of construction material and removal of the same on completion of work.
- All erection accessories, consumables and miscellaneous materials, though not specifically indicated in this specification, but actually required for completing the job in all respects.
- Assistance in Erection, testing and commissioning of materials and system as a whole.
- All necessary fixtures, supports, bushes, gaskets, glands, supporting arrangements etc.

iii. All works of the FAS & other works included in the scope will be done simultaneously from the date of issue of FOA. Bidder shall organize equipment and manpower accordingly to meet this requirement as per instruction of PMC.

2.0 REFERENCE CODES AND STANDARDS:

The Fire Protection system shall meet or exceed the requirements of the latest edition of the following codes, regulations and standards, except as superseded herein. In cases where more than one code, regulation or standard apply to the same condition, the most stringent shall be followed.

All materials, equipments, piping, valves, fittings etc. dimensional standards, tolerance, prices of manufacture and testing procedure shall be in accordance with the latest revision of relevant Indian, British, American standards wherever applicable.

The material used and equipment supplied shall be new and the best of their kind and shall comply with the latest revisions of all relevant standards. The tenderer shall indicate in his tender the relevant standards to which the equipment, piping, fittings, etc. offered by him shall comply with. The latest revisions of applicable standards indicated in the technical specification shall be used for the design, manufacture, inspecting and testing of the items covered in this specification. The following codes and standards shall be considered for design:

- OISD-113: Classification of areas for electrical installations at hydrocarbon processing and handling facilities.
- OISD-163: Process control room safety.
- National Fire Alarm code (NFPA-72)
- OISD – 179, OISD-144, OISD-169 & OISD - 214
- National Fire Protection Association, USA (NFPA) codes
- CEA-Central Electricity Authority Notifications.
- IS/IEC 60079-11 Specification for Intrinsically Safe electrical apparatus & circuits.
- IS/IEC 60079-0 General requirements for electrical Apparatus for explosive atmosphere.

- IS/IEC 61241-14 Electrical apparatus with protection of enclosure for use in presence of combustible dust.
- National Electrical Manufacturers association (NEMA) Publication-Enclosure for Industrial Controls & Systems.
- SMPV Rules, PESO Nagpur (For Storage Cylinders).
- PNGRB Rules & Guidelines.
- MECON specifications& any other applicable code for Hydrocarbon Industry

3.0 GENERAL DESIGN CRITERIA FIRE PROTECTION SYSTEM

Fire Protection System shall be designed primarily as per OISD, NFPA, IS and TAC guidelines shall be referred for system design and compliance.

The Scope of work shall include Design, Engineering, Supply, Inspection, assistance in Erection, and Testing & Commissioning of following facilities:

S. No	Station	Fire Protection Facility
01	Refer SOR for Buildings.	The Following Fire Protection Facilities have been Envisaged: i. Multi criteria, Photoelectric Smoke Detectors, Heat detectors and other accessories. ii. Heat Detectors (Intrinsically Safe) for Battery room iii. Manual Call points at Strategic Locations. iv. Linear Heat Sensing cable for Cable trenches along with smoke detectors in cable trenches. v. Fire Alarm Panel (Microprocessor based Digital fire Alarm panel with Redundant Modbus communication & TCP/ IP communication Module vi. Repeater Panel at security Gate. vii. Zone Classification as per Enclosed Drawing & Datasheets.

Note: - Unless otherwise specified, all detectors, MCPs, Hooters etc. to be installed in the buildings shall be addressable type. Any Extra Hardware, if required, for non-addressable devices to make it addressable, cost of the same shall be included in the SOR and no separate payment for the same shall be borne by Client/MECON.

3.1 FIRE DETECTION & ALARM SYSTEM:

This clause shall be read in Conjunction with Standard Specification for Fire Detection and Alarm System (Specification No: MEC/TS/05/28/081/11) and in Case of Discrepancy between This Clause and standard specification, The terms & specifications of this Clause shall Prevail.

3.1.1 ADDRESSABLE FIRE DETECTION-CUM-ALARM SYSTEM

Automatic fire detection-cum-alarm system shall be provided for all the facilities mentioned in the PJS and described elsewhere. In addition to detection system, manual push button fire alarm system (manual call points) shall be provided for all the premises / bays within the scope of the Tenderer. Provision shall also be kept by the Tenderer in the control panel to repeat the fire signal to the repeater panel at the security gate. These areas shall be detected the Fire using State-of-the-art Automatic Smoke/ Heat Detection/ Alarm & Fire Control mechanism using Code of Practices approved by agencies such as Bureau of Indian Standards (BIS), British Standards Institute (BSI) or National Fire Protection Association (NFPA). Relevant certificate of approval shall be enclosed. The alarms need to be monitored on a 24 x 7 basis & logged for providing reports. The Fire system shall deploy High Sensitivity Smoke/ Heat Detectors (HSSD) to allow swift detection of heat and/or smoke.

- Fire Alarm Panels consisting of:
  - Microprocessor based Addressable Digital fire Alarm panel with Redundant TCP/ IP Modbus communication Module
  - Repeat Alarm Panel Microprocessor based addressable Digital Repeater panel with alphanumeric keypad
- Automatic Fire Detectors
- Linear Heat Sensing Cables
- Manual Break Glass Boxes / Manual Call Points (MCP)
- Response Indicators
- Exit Signs
- Hooters
- Flashing Lights
- Any other item(s) required for the completeness of the system

Detection system for cable Trenches, below false flooring:

In cable trenches and below false floors, detection of fire shall be by a highly accurate & sensitive mechanism which can detect direct & indirect fire exposures.

LHS shall be used for detecting heat from a fire over its entire length. The sensor cable shall consist of a twisted pair of copper coated steel conductors covered by a temperature sensitive insulation. The LHS shall be UL/FM/LPCB/VDS approved and shall be designed for open area as well as proximity detection. LHS shall be compatible with any fire control panel that is capable of accepting contact closure type initiating devices.

Linear Heat Detection System shall be used for effective activation of a warning or alarm signal indicating a condition of excessive heat or fire. In this system, each discrete addressable LHS cable zone shall report an individual alarm to the addressable fire control panel. The detector should be capable of detecting fire even under harsh conditions. The response behavior of the detector shall be precisely adjustable to suit the environment & small temperature variations caused due to environmental fluctuations and shall not result in false alarms. The detector unit shall send fault signal when the LHS is damaged (Cut or damaged).

The detector specification are as follows:

- Rated Activation Temperature Tolerance : ± 5%
- Temperature Rating : 70 deg C
- Min. Installation operating temperature : 5`C
- Application : Indoor/Outdoor
- Outer Jacket Material : PVC
- Conductor Material : Tinned copper clad steel
- External Diameter Typical : 0.15" nominal (3.8 mm nominal)
- Conductor Diameter : 0.035" nominal (.89 mm nominal)
- Outer sheath Thickness : 0.020" nominal (0.5 mm nominal)
- Tensile Strength : 245K PSI/Conductor
- Bend Radius (Minimum) : 2.5 inches (63.5 mm)
- Weight nominal per length : 0.016 lbs/ft (24 grams/m)
- Conductor Resistance at 20 °C (max) : 0.058 ohms/ft 2 conductor

The parameters as mentioned against each requirement are indicative only.

3.1.2 GENERAL DESIGN CRITERIA

a) Hazardous Area Requirements

Instruments located in hazardous area shall be certified to meet or exceed the electrical hazardous area classification. In general, all field mounted instruments & electrical components shall be preferably certified as Ex'i'. Incase Ex'i' is not available, Ex'd' can be proposed suitable for Zone-1 Gr. IIA/IIB, T3 area. All electrical and instrumentation items shall be PESO certified irrespective of their installation in safe or hazardous area.

b) Ingress Protection

Unless elsewhere specified in the Individual Datasheets of the item, Individually supplied instruments including cable glands and blanking plugs shall have an environmental protection rating of IP 65 minimum. For indoor installation, environmental protection rating of IP 42 minimum shall be applicable.

c) Electromagnetic Compatibility

All electrical equipment shall comply with Electromagnetic Compatibility (EMC) requirement specified in IEC 61000.

d) Quality Assurance

CONTRACTOR, SUPPLIER / VENDOR of equipment shall operate a Quality Assurance system. This system shall be based on the principles of ISO 9001 or equivalent. The quality system may be subject to auditing and monitoring by the OWNER or his representative.

e) Reliability and Maintenance

High reliability of instrumentation is of paramount importance and therefore only existing field proven instrumentation, which is readily available and used widely in similar applications, shall be considered. Selection of instrumentation systems and equipment shall take account of the projects overall requirements for high availability. Importance shall be given to reducing the maintenance frequency and duration.

f) Special Tools

The SUPPLIER / VENDOR of the main equipment shall supply tools and any other specialist items required to operate and maintain any instrument or system. The testing equipment for smoke detector, heat detector, Gas detectors, etc. shall be supplied by vendor as per datasheets & material requisition hardware along with converter, cables, interfacing cables, etc. and shall form part of base price.

g) Design Life

The design life of field instrumentation shall be 15 years minimum. The design life of control system shall be 20 years minimum.

h) Surge and Transient Protection

Surge / Transient protection to be provided for all electronic instruments installed in the field at instrument end.

i) Labeling and Tagging

Each LFAP / Repeater panel, terminal strip, terminal and interconnecting cable end, F&G devices shall be clearly marked with proper identification. The identification shall also be

shown on the Vendor's drawings. Each circuit breaker and switch shall be tagged with permanently mounted name plate that identifies its service.

3.1.3 GENERAL REQUIREMENTS

a) System Requirements

Information from FAS shall transmit and integrate with the main control room. All actuating, notification, supervisory-signaling and interlocking devices shall be connected to the FAS. The FAS shall comply with requirements of OISD / NFPA 72 for protected premise signaling systems except as supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.

The system shall be an active/interrogative type system where each transponder and/or addressable device is repetitively scanned, causing a signal to be transmitted to the FAS indicating that the device and its associated circuit wiring is functional. Loss of this signal at the FAS shall result in a "trouble" alarm indication as specified hereinafter for the particular input.

The system shall provide local and remote annunciation that include displays. All the alerts (zone wise) can be configured and shall be sent via SMS (Short Message Service) to the stored mobile numbers (minimum 5 no. of clients) in the Local fire Alarm Panel (LFAP) system. The additional hardware if required shall be mounted inside of the LFAP panel.
The repeater panel shall mimic all the displays on the main fire alarm panel. Repeater fire alarm panels shall be provided at appropriate places which will be manned 24-hours. Repeater panels are not required at SV-stations & IPS.

Provision for acknowledgment of event/alarm from Station PLC/SCADA RTU to be provided. This feature should allow operator to silent the hooter though the beacon shall operate till the initiating device is restored to normal.

b) Functional Requirements:

General: The fire alarm system shall:

- Monitor continuously all points assigned to avoid the generation of false alarms
- Generate alarms and transmit information to the control room.
- Local Fire Alarm Panel (LFAP) to be integrated with Repeater Panel at security gate.

Control of System: By Local Fire Alarm Control Panel.

System Supervision: Automatically detect and report open circuit, short circuit and ground fault of wiring for initiating device, signaling line, and notification-appliance circuits. Fault isolator modules as applicable shall be considered by vendor.

Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one facility or device shall not be altered by subsequent alarm, supervisory, or trouble signals. An alarm signal is the highest priority. Supervisory and trouble signals have second and third-level priority. Higher-priority signals shall take precedence over signals of lower priority, even when the lower priority condition occurs first. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.
System Supervision: Automatically detect and report open circuit, short circuit and ground fault of wiring for initiating device, signaling line, and notification-appliance circuits. Fault isolator modules as applicable shall be considered by vendor.

Non-interference: A signal on one facility shall not prevent the receipt of signals from other facilities or zone.

System Reset: All facilities/zones shall be manually re-settable from the Local Fire Alarm Control Panel by password protected authorized personnel after initiating devices are restored to normal.

System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement shall prevent alarm capability reduction when an open circuit, ground or wire-to-wire short occurs, or an open circuit and a ground occur at the same time in an,

- Initiating Device Circuits (IDC) System Wiring
- Signaling Line Circuits (SLC) System Wiring
- Notification Appliance Circuits (NAC)

Loss of primary power at the Fire Alarm Control panel initiates a trouble signal at the station PLC. An emergency power light is illuminated at both locations when the system is operating on the secondary power supply i.e. on the battery back-up.

Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a smoke or heat detector etc. initiates the following:
- Notification-appliance operation.

• Identification of alarm at the LFAP and at Repeater Panels. Recording of the event in the system memory.

Alarm Silencing, System Reset and Indication: Controlled by switches on the LFAP and at the Repeater Panels. Silence command from PLC also to be considered. All alarm/events generated at LFAP to be transmitted to Station PLC over Modbus TCP/IP

Silencing-switch operation halts alarm operation of notification appliances and activate an
• “alarm silence" light. Display of identity of the alarm facility/zone or device is retained.
• Subsequent alarm signals, from other devices or zones, shall reactivate notification appliances, until silencing switch is operated again.
• When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.Removal of an alarm-initiating device or a notification appliance initiates a "trouble" signal indication at the LFAP and Repeater panel for the device or zone involved.

Alphanumeric display: The display shall have plain-English language descriptions of alarm, supervisory, and trouble events; and addresses and locations of alarm-initiating or supervisory devices originating the report, display monitoring actions, system and component status, system commands, programming information and data from the system's historical memory.

c) Cabling

Special attention shall be paid to the accessibility and withdrawal of the system cables. Cable entry shall be through the gland plate at the bottom of the panel/cabinet. Sufficient free space shall be made available for correct accommodation and termination of the cables.

Cables shall have PVC insulation, suitable for the loads applicable. Connected wiring shall have an adequate cross section of preferably 1 square millimeter. If stranded copper wire is used, wire ends at terminal points shall be provided with suitable wire crimp pins/lugs and markers. All internal wiring shall be laid in PVC close-slotted ducting with a covering lid. Ducting shall have 50% spare capacity.

Cables carrying signals susceptible to electrical interference shall be adequately screened. All interconnecting wiring shall be passed through the cabinet entries. All interconnecting cables shall be tagged at both ends.

d) Secondary Power Supply:

Unless otherwise specified, secondary power supply for local fire alarm panels shall be through battery provided by the Vendor. The LFAP shall have sufficient battery backup to operate the system under quiescent load for a minimum of 48 hours and at the end of that period, shall be capable of operating all alarm notification appliances used for evacuation or to direct aid to the location of an emergency for 1 HOUR. The battery capacity shall comply the requirements of NFPA 72 Chapter 10.6.7.2.

Battery sizing shall consider the maximum quantity of F&G devices that can be connected in the loops. The sizing calculations shall be no cost/time implication for providing adequately sized batteries and chargers of approved rating during the order execution. The battery sizing calculations shall include an overall ageing factor of 10% and a safety margin of 10% to the calculated amp-hour rating.

Operation on secondary power shall not affect the required performance of local fire alarm system. The system shall produce the same alarm, supervisory and trouble signals and indications. The switch-over from primary source to secondary power source shall be automatic.

e) Central Processing Unit:

The Central Processing Unit shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory, and shall not be lost with system primary and secondary power failure.

The Central Processing Unit shall also provide a real-time clock for time annotation of all system events. The time-of-day and date shall not be lost if system primary and secondary power supplies fail. Provision of SPD for field cabling & Power supply to be taken.

The CPU and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL 864 standards.

Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques.

f) Wiring Installation

Wiring within Enclosures: All wire and cables shall be fire resistant and shall not release harmful quantities of toxic gases or dense smoke. The Vendor shall provide internal wiring compliant with the requirements of IEC 60331.

Components and devices, such as terminal blocks, raceways, wire troughs, wire cleats, cable ties receptacles, indicating lamps lenses, etc. shall be manufactured from “non-burning” materials as defined by ASTM D635. The Vendor is responsible for all internal system cabinet wiring. All electrical design shall satisfy the intent of all applicable codes including NFPA, IEC codes and any local codes having jurisdiction at the job site. All internal wiring shall be stranded copper. All wiring shall be continuous from termination to termination point without splices.

Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace and train conductor runs to terminal points with no excess. Connect conductors that are terminated, spliced or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimpon terminal spade lugs, pressure-type terminal blocks or plug connectors.

3.1.4 DETECTORS AND FIELD EQUIPMENT

a. General

All F&G detection devices shall provide means to indicate to the F&G system all operating modes such as detector failure, in calibration, over-range and under-range.

All F&G devices shall comply with the requirements specified in this document and the F&G device data sheets. Vendor shall demonstrate that all sensors/devices connected to the F&G system / station PLC & LFAP system are compatible with the system.

All F&G devices shall comply with the requirements specified under General Design Criteria of FAS specification for ingress protection, Hazardous area, EMC compatibility, reliability etc.

The F&G detection devices for all process areas shall be wired individually to the station PLC located within the control room. Also the gas and smoke detectors in HVAC inlet and hydrogen detector in battery room to be wired to station PLC. The devices connected to

station PLC shall be non-addressable type.

The detectors located in non-process buildings such as control room, substation & guest house etc. shall be of addressable type and shall be looped and connected to microprocessor based addressable FAP system. The addressable loops shall be considered building/fire zone wise.

Input modules shall have a self-testing diagnostic, which tests for short circuit conditions. If a shorted field input circuit is detected in a duplicated or triplicate input, the faulty circuit shall be disabling and the main processors shall use inputs from the healthy input circuits.

b. Non-addressable & Addressable Devices

All fire & gas detectors shall be strategically located in plant area as well inside building to cater for monitoring of all possible fire, gas and smoke scenarios.

All point type hydrocarbon gas detectors and hydrogen detectors shall be provided with collecting cone. Gas detectors shall be selected based on the type of gas to be detected.
F&G devices in the field shall be PESO certified and suitable for hazardous area classification of Zone 1, Gas group IIA/IIB, Temperature class T3, weather proof to IP-65 minimum. Detectors shall be preferably certified as Ex'i'. If Ex'i' is not available Ex'd' can be proposed.

The hydrogen detectors in battery room shall be PESO certified and suitable for hazardous area classification of Zone 1, Gas group IIC, Temperature class T3, weather proof to IP-65 minimum, classified Ex'd' explosion proof.

Fire devices located inside the building shall be looped to LFAP and of addressable type. The IP rating shall be IP-42 minimum. Series & end of line resistors shall be installed inside the enclosures as detailed on the data sheet.

The detectors shall be listed by UL or Nationally Recognized Testing Laboratory as meeting the calibrated sensitivity test requirements of NFPA 72.

The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel. Wherever applicable the contact rating shall be 2A at 24 VDC.

The Fire detection & Alarm System Shall Include:

i. Multi criteria, Photoelectric Smoke Detectors, Heat detectors
ii. Heat Detectors (Intrinsically Safe)
iii. Smoke Detectors (Intrinsically Safe)
iv. Hydrocarbon detectors
v. Heat Detectors
vi. Hooter and Flasher
vii. Manual Call points
viii. Manual Call Points suitable for hazardous area (Zone-1, gas Group IIA/B & Temp Class T3.)
ix. Beacon Hooter and Flasher suitable for hazardous area (Zone-1, gas Group IIA/B Temp Class T3.)
x. Linear Heat Sensing cable
xi. Fire Alarm Panel (Microprocessor based Digital fire Alarm panel with Redundant Modbus communication & TCP/ IP communication Module.
xii. Repeater Panel at security Gate.
xiii. Modules (Monitor, Control, Zone Interface, Fault Isolators & Exit)
xiv. Sign Boards

i. **Smoke Detectors:** Smoke Detectors shall be installed in Control room Building, , MCC room, Electrical Sub station & Cable Celler, security cabin, ware house etc. Smoke detectors will be provided for detection of any smoke that may be generated due to fire inside the building. Voting logic shall confirm the presence of fire and take automatic action to shutdown HVAC & closure of Fire Damper and activate release of fixed fire Suppression agent.

ii. **Hydrocarbon Detectors:** Hydrocarbon detectors shall be installed near all potential Leak Source. The detector shall be gauged to provide the first alarm at 10% LFL and the second confirm alarm at the 60 % LFL level. Voting logic shall confirm the presence of flammable environment and provide alarm only, no automatic actions except HVAC tripping & CAS activation from PLC on identifying the abnormities in the plant.

iii. **Heat Detectors:** Heat detectors shall be provided in the pantry appropriate location in the substation and Control buildings.

iv. **Manual Call Points:** Manual Call Points (MCP) are provided at the strategic locations at the exit door / outer-side/escape ways of different room of the Substation building, Control building, any other building mentioned in the tender documents and shall be installed along the escape ways in the process area to activate a fire alarm when visual detection of any smoke or fire by personnel. When operated, the manual call points shall

give a general audio-visual alarm on the fire and gas system panel to alert the operations personnel in the control room.

v. Manual Call points (weather proof and explosion proof) shall be installed at strategic locations of Pump station, Delivery & Terminal Stations in Field which shall be suitable for Hazardous area & shall be certified for use in Zone 1, Gas Group IIA/B, and Temperature Class T3.

The manual alarm call points shall be foreseen for fire, abandon, and emergency. The manual alarm call points located on field shall be connected directly to the F&G system / station PLC and located inside building shall be of addressable type and connected to LFAP. The enclosure material for outdoor installation shall be Cast Aluminum (LM-6).

The manual alarm call point shall be "Break Glass Type". When activated the MAC shall stay in latched position and should not be resettable without proper suitable means. They shall be provided with a key operated test facility to enable periodic testing of the alarm contacts without the need to remove or break the glass. The enclosure shall be painted with fire red color and an inscription "Break Glass in Case of Fire", shall be painted in white letters or riveted on the enclosure by a stainless-steel nameplate.

vi. **Linear Heat Sensing Cable:** LHS cable shall be provided in the cable trench of battery room, Electrical and control room. This is in addition to the Smoke detectors to be installed in cable trenches.

vii. **Fire Alarm Panel:** Fire detection signals shall be transmitted to the Fire Alarm Control panel and the same shall be interface with PLC system in the centralized control Room. Fire Alarm Control shall be located in the control room. The panel shall operate on 24V DC off 230V,1ph AC power supply & backup by battery bank. In the panel in- built battery charger shall be provided.

viii. **Visual Alarm:** Visual alarm shall be flashing xenon type with 60 flashes per minute and shall be rated at 24 VDC. Enclosure material for outdoor installation shall be Cast Aluminium (LM-6). The lens shall be with lens protection cover. Visual alarm shall be suitable for surface mounting with a 360-degree Cone of vision. Visual alarm color shall be RED. The visual alarm shall be readily visible under all probable lighting conditions. The Visual alarms located inside the building shall be suitable to connect to LFAP and of addressable type. If required, Vendor shall provide an additional terminal box to connect power supply and signal cables along with Visual alarms. The stainless-steel mounting accessories suitable for 2" pipe or surface mounting shall be considered in

Vendor's scope of supply.

ix. **Audible Alarm:** Audible alarm shall be of low-profile design and intended to use for both indoor and outdoor applications. Audible alarm for outdoor applications shall have a high sound output with low current consumption (4.1 mA at a standard volume setting). Audible alarm shall have following features.

- Detection coverage / Range: 100 dBA for Outdoor and 85 dBA for Indoor @ 1 meter
- Tone: On-Off modulating tone for pre-alarm & continuous for main alarm
- Audible alarm colour: Red

The audible alarms located inside the building shall be multi tone alarm suitable to connect to FAP and of addressable type. The supply scope of any additional hardwired required (Relay modules, interface modules etc.) shall be considered by Vendor in his scope of supply.

If required, Vendor shall provide an additional terminal box to connect power supply and signal cables along with Audible alarms. The stainless-steel mounting accessories suitable for 2" pipe or surface mounting shall be considered in Vendor's scope of supply.

x. **Modules** (Monitor, Control, Zone Interface, Fault Isolators & Exit): -

The control module shall receive signals from the initiating devices, such as smoke detectors and heat detectors, and then activating the notification appliances, such as horns, strobes, and speakers. The control module shall also interface with other building systems, such as HVAC and access control, to initiate appropriate responses in the event of a fire. The required supply is drawn from a 24V power supply unit. The RED blinking LED indicates normal operating conditions and the steady state LED for activated conditions. DIP switches shall be provided for addressing of the module. The output circuit should be supervised for faulty condition.

The Monitor module shall be used to send FIRE signal to from Linear Heat sensing Cable inside cable Trenches and Cable cellars to Fire Alarm Panel. The Monitor Module shall convert analog signal in to addressable signal for Fire Alarm Panel.

Zone Interface module shall be used for the addressable FACP to interface and monitor conventional smoke detectors and manual call point. The Zone module shall be addressed by using the DIP switch to communicate with addressable FACP. It shall transmit the status (normal, open, short or alarm) of one zone of 2-wire / 4- wire

detectors to the FACP. Zone module shall supervise the zone of detectors and the connection of the external power supply respectively.

The Fault Isolator modules should be spaced between groups of sensors or modules in a loop to isolate the faulty area from the rest of the loop. If a short occurs between any two isolators, then both isolators immediately switch to an open state and isolate the devices between them. The remaining units on the loop continue to fully operate. The fault isolator shall be used to connect a maximum of 20 devices to each isolator. The Fault Isolator modules shall be used to isolate short circuit problems within a section of a loop so that other sections can continue to operate normally.

The Zener Barrier shall prevent the transfer of unacceptably high energy from the safe area into the hazardous area. The Zener diodes in the Zener Barrier shall be connected in the reverse direction.

xi. **Sign Boards: -** The exit signs shall be lighted LED exit signs to comply with building fire codes and insurance standards. These shall be energy-saving, illuminated, long-life LED exit signs.

3.**1.6 MANDATORY SPARES**

For each station, Vendor shall supply 10% of each type addressable devices, loop cards, fault isolators, input/output modules, power supply cards, communication modules etc. as mandatory spares and / or minimum one of each type (whichever is greater). In case of decimal next higher number shall be considered for supply. 10 % or minimum 1 number of each type of electronic card installed in the FAP shall be supplied as Mandatory spare for each location. The cost of mandatory spares shall be included in the Item rate for Fire alarm system.

3.1.7 INTERLOCKING WITH A/C & VENTILATION SYSTEM

There will be interlocks to shut off the exhaust fans and simultaneous tripping of A/C, Fans and ventilation system. The fire signal from first detector will operate the audio-visual alarm whereas on confirmation of fire signal from the other detector through cross zoning, the ventilation/air conditioning system shall be switched off automatically. Appropriate tripping relays and their contacts shall be provided by the tenderer for this purpose considering zone wise operation, partitions in cable gallery/ basement and number of fans/ systems operating in the electrical rooms.

Potential free contacts (Relay modules) shall be made available for each zone for tripping of respective ventilation/air conditioning system. Location of above relay module shall be as finalized during detailed engineering stage. Tenderer to consider all accessories such as cabling/ wiring, contact multiplication etc. required to achieve the system requirement. Contact of auxiliary relays shall be made available in relay auxiliary panel of the above- mentioned places and shall be suitable to wire directly in MCC/starter panel control circuit. The relay modules shall be considered as part of fire alarm panel.

PARTICULAR JOB SPECIFICATION FOR INERT GAS BASED CLEAN AGENT SYSTEM

1.0 INTENT OF SPECIFICATION

The intent of the specification is to cover the design, engineering, supply, manufacture / fabrication, procurement, packing, forwarding to site, unloading at site, receipt, storing, erection, testing, shop painting, commissioning and guaranteed performance of the following and as outlined in various chapters of the technical specification:

A. Clean Agent System for Ceiling void, Room void & Floor void/cable trenches for Control Room Building.

B. Associated Piping, supports, Hooters, Sign Boards, nozzles etc.

C. Associated Civil & structural works, electrical & instrumentation works including supply of all materials.

The Control room sizes for clean agent system as indicated in SOR. The Type of Inert gas shall be as mentioned in SOR

Gas volume calculation along with requisite nos. of cylinder shall be carried on the basis of Architectural IFC drawings.

The contractor shall include all supports, inserts etc. required for the above system, instrumentation & electrics of the system and all necessary operating platforms and ladders, if required, for the safety and maintenance of the equipment and the system as a whole. Contractor shall consider Clean Agent Suppression System for Cable Trenches/ Floor void without additional cost to the company.

The delivery of the items shall be made at site as elaborated in the specification.

Any additional item/ component that are not specifically mentioned in the specification but are required to make the system/ equipment complete in all respects for safe operation and guaranteed performance shall be under the scope of this specification.

The contractor shall furnish the names of the sub-suppliers, if any, along with the units / quantity intended to be procured from them. List of approved makes of materials is enclosed in the tender document. Only those vendors shall be acceptable for whom the names are specified against the items. For any other item not mentioned in the list, the successful party will take prior approval before placement of order.

Provision shall be made for tripping off the ventilation, Fans and A/C system and power supply to the fire affected zone automatically along with the discharge of the extinguishing media after getting the confirm fire signal.

2.1 Technological Part

Depending upon the nature of the units to be protected from fire, fire protection systems

viz. clean agent-based Fire suppression system shall be provided. The system shall total flooding clean agent fire suppression system designed to provide a uniform concentration within the protected area.

2.2 The system as a whole along with equipment, components, flow calculation software etc. shall be approved by UL / FM / ULC / LPCB/VDS.

2.3 **WORK TENDERED**

The work tendered in this bid package consists of Design, supply of materials as required, installation, testing and commissioning of Fire Protection system including all Associated Mechanical, Civil, Structural, Electrical, Instrumentation etc.

The work being tendered is covered as indicated below:

Sl. No	Description	Scope of Work
1	Clean Agent System	- Design, Supply, installation & commissioning of High-Pressure Inert gas based clean agent system - Associated Piping, supports, Civil & structural works, electrical & instrumentation works including supply of all materials.

2.4 All works of the piping & other works included in the scope will be done simultaneously from the date of issue of FOA. Bidder will organize equipment and manpower accordingly to meet this requirement as per instruction of Engineer-in-charge.

2.0 **METEOROLOGICAL DATA OF SITE**

The fire protection systems shall be designed taking into account the meteorological data prevailing at the project site.

3.0 **SCOPE OF WORK AND SERVICES**

3.1 **General & Technical Criteria.**

The scope of work of the Tenderer shall include supply, erection, testing and commissioning of clean agent system Flooding system in the control room, associated civil, electrical and instrumentation facilities.

The tenderer shall furnish the list of commissioning and two (2) years maintenance and operational spares in the offer. The bidder must include in the quoted price for the following mandatory spares to be supplied with the Clean Agent system at each location: The Price for the same shall be included in the Lump sum price of clean agent system

Sr. No.	Item Description	Unit	Qty,
1.	Cylinder valve with Pressure Relief device	Nos.	4
2.	Inert Gas Cylinder filled with Inert gas	Nos.	1

3.	Manual/Pneumatic actuator	Nos.	4
4.	Solenoid actuator	Nos.	4
5.	Discharge Nozzle		
6.	25NB	Nos.	4
7.	15NB	Nos.	4
8.	Gas Release Unit	Nos.	4
9.	Gas Inhibit Unit	Nos.	4
10.	Monitor Module	Nos.	1
11.	Control Module	Nos.	1
12.	Hooters	Nos.	1
13.	Panel Mounted Instruments (Fuse & LED)	Nos.	4
14.	FRLS Cables	Mtrs.	50
15.	PCB used in Gas Release Panel	Nos.	1
16.	Pressure Gauge with Pressure Switch	Nos.	2

3.2 The scope of work and services to be rendered by the Tenderer for installation of firefighting system shall include but shall not be limited to the following activities.

i) Design, engineering, manufacture/fabrication, assembly, shop testing and shop painting, sequential packing, delivery at site, unloading, unpacking, storage at site, site handling, preparation of erection drawings, erection as per approved drawings, site testing, painting, commissioning and fulfillment of guarantee of fire protection systems, sub-systems and integrated systems as described above and also covered under this tendering specification.

ii) Miscellaneous materials and services, if not otherwise specifically asked for, shall include the following:

- Constructing site office, covered store, open storage at designated place including supply of construction material and removal of the same on completion of work.

- Site cleaning, removal and disposal of debris, maintaining clean condition in and around the working place and as instructed by authorized representative of MECON / Owner.

- Distribution of electric power supply for erection work through licensed electrical contractor / licensed electrician. Construction power shall be made available by Owner at one place.

- All piping integral to or between any equipment furnished under this specification, except as otherwise specified.

- All necessary isolation valves fitting at the tapping points and branch pipes.

- Coupling guards for all exposed shafts and couplings.

- Base plates, thrust blocks, duck-foot bends, matching flanges, supporting materials and shims.

- All necessary instruments, power and control wiring integral to any equipment furnished under this specification. This shall include terminal blocks and integral wiring to these terminal blocks for equipment requiring external connection.

- All erection accessories, consumables and miscellaneous materials, though not specifically indicated in this specification, but actually required for completing the job in all respects.

- All necessary connections for hook-up with owner network.

- Erection, testing and commissioning of materials and system as a whole.

- Initial fill of gas and other fire extinguishing media.

- All necessary fixtures, supports.

3.3 Formats for Work Permit System shall be as per Owner format and approval to be obtained as per Owner Rules:

3.4 All the high-pressure Cylinders with its cylinder valve to be used for the clean agent system shall have PESO approval as per IS: 7285-2.

3.5 Support letter from OEM from whom the bidder intends to take authorization for the system, authorizing the bidder for Clean Agent System, for Control Room for design/ engineering/ execution, commissioning & after sales service for specialized systems such as Clean Agent Suppression system compatible to the specifications shall be submitted along with the bid.

3.6 System / equipment / component offered shall be strictly in line with technical specifications defined in the tender document. No deviation to technical specification shall be permitted. Bidders must note that offer of bidders not matching the technical specification of their item / system / component with the tender specifications shall be rejected.

4.0 BRIEF FUNCTIONAL DESCRIPTION

This clause shall be read in Conjunction with Standard Specification for Gas/Clean Agent Flooding system. SPECIFICATION NO: MEC/TS/05/28/081/06 and in Case of Discrepancy between This Clause and standard specification, the terms & specifications of this Clause shall Prevail.

4.1 System Description:

1. The system shall be an inert gas based total flooding clean agent fire suppression system designed to provide a uniform concentration within the protected area.

2. Clean agent gaseous fire suppression systems shall be designed and installed to meet the requirements of NFPA 2001 (Latest Edition). Hence anything specified as “Mandatory” in NFPA-2001, although not specifically mentioned in this specification, shall be considered as part of this specification.

3. Clean agent gaseous fire suppression systems shall include 100% installed reserve of the agent to be available for second ‘shot’ if required.

4. In buildings where clean agent is required to be discharged into a number of individual rooms

the design of the clean agent system shall be based on a central bank of stored clean agent with selector valves arranged to divert the extinguishing agent to the room where fire has been detected.

5. The centralized skid shall be designed for the largest room. However, the discharge logic will ensure only the required amount of extinguishant be released in smaller enclosures. It shall be ensured that concentration of gas in the protected area does not exceed the NOAEL concentration.

6. After completion of the time-delay sequence, the Clean Agent system shall discharge and the following shall occur:

    a. Illuminate a "SYSTEM FIRED" lamp on the control panel face.
    b. Energize a visual indicator(s) outside the hazard in which the discharge occurred.
    c. Energize a "System Fired" audible device.

    The system shall be capable of being actuated by manual discharge devices located at each hazard exit. Operation of a manual device shall duplicate the sequence description above except that the time delay and abort functions shall be bypassed. The manual discharge station shall be of the electrical actuation type and shall be supervised at the main control panel.

7. The clean agent system flooded system shall be designed to protect the single largest risk (volume wise) in a particular room of a building.

8. The quantity of clean agent gas shall be sufficient to protect the single largest risk in each building with 100% standby. The suppression system shall provide for high-speed release of Gas based on the concept of total Flooding protection for enclosed areas.

9. The Fire Suppression System shall include a detection and control system provision for both pre-alarm and automatic agent release. The detection and control system that shall be used to trigger the Fire suppression shall employ cross zoning of multi-criteria smoke detectors. A single detector in one zone activated, shall cause in alarm signal to be generated. Another detector in the zone activated, shall generate a pre-discharge signal and start the pre-discharge condition. When Two detectors in a particular zone are activated, it shall give confirmation for Fire for release of Gas Suppression system. Manual Release & Manual Abort Switches shall be provided in the protected Room/Building.

10. The discharge nozzles shall be located in the protected volume in compliance to the limitation with regard to the spacing, floor and ceiling covering etc. The nozzle locations shall be such that the uniform design concentration will be established in all parts of the protected volumes. The final number of the discharge nozzles shall be according to the OEM’s patented and certified software, which shall also be certifiers such as UL/FM/LPCB/ULC

11. The design of the system shall incorporate all necessary personnel safety protection interlock systems with separate fire detection and alarm control panel with all necessary logic to control and monitor detection, local alarm and fire extinguishing system in accordance with NFPA 72 and provide interface with plant e.g. HVAC shutdown.

The Control room sizes for clean agent system are indicated in SOR. The system as a whole along with equipments, components, flow calculation software etc. shall be approved by UL / FM / ULC / LPCB/VDS.

4.2 Clean Agent Fire Suppression System (Inert Gas High Pressure System)

Fire in strategically important places like computer rooms, control rooms, switch gear rooms, data storage rooms, server rooms, data storage archives, libraries, laboratories etc. is a serious hazard to highly precious and irretrievable items and properties. Occurrence of fire besides leading to personnel injuries and property damage also leads to loss of productivity and precious time. The primary cause of fire may be due to short circuit / overheating of certain components somewhere in the areas. Since most of the areas are unmanned and completely closed, fire inside is not visible and accessible from outside till it becomes too big, dangerous and unmanageable.

Fire suppression with water-based systems such as hydrant or sprinkler system can damage the assets permanently. Therefore for these costly & critical areas, the Fire Protection System envisaged calls for early detection of fire and quenching the same by flooding the area with gas based fire suppression system besides giving out an audio visual alarm. The design shall be strictly as per NFPA standard NFPA 2001.

The suppression system shall provide for high-speed release of Gas based on the concept of total Flooding protection for enclosed areas with **High Pressure clean agent gas (Inert Gas).** A Uniform extinguishing concentration shall be as applicable and approved by NFPA 2001 of the gas for 70 deg F, or higher as recommended by the system / agent manufacturer. The system discharge time shall be in accordance with NFPA standard 2001.

The Fire Suppression System shall include a detection and control system provision for both pre-alarm and automatic agent release.

The detection and control system that shall be used to trigger the Fire suppression shall employ cross zoning of LHS and Multi-criteria smoke detectors. A single detector in one zone activated, shall cause in alarm signal to be generated. Another detector in the second zone activated, shall generate a pre-discharge signal and start the pre-discharge condition.

The discharge nozzles shall be located in the protected volume in compliance to the limitation with regard to the spacing, floor and ceiling covering etc. The nozzle locations shall be such that the uniform design concentration will be established in all parts of the protected volumes. The final number of the discharge nozzles shall be according to the OEM's patented and certified software, which shall also be certifiers such as UL / FM/LPCB/VDS.

The Gas shall be stored in seamless storage containers complying with the SMPV Rules set out by Chief Controller of Explosives, Nagpur, India. The Bidder shall be required to produce a NOC for the Chief Controller of Explosives, Nagpur for the storage containers against the cylinder identification numbers punched on them. Welded cylinders for agent storage will not be acceptable

The Gas shall be discharged through the operation of an Electric (solenoid) operated device or pneumatically operated device, which releases the agent through the pneumatic operated pressure valve. Systems that employ explosive or pyrotechnic devices for the discharge shall

not be permitted. The Gas discharge shall be activated by an output directly from the Gas Release control panel, which will activate the solenoid valve.

4.3 General Requirement

All devices and equipment shall be UL Listed / FM approved / LPCB Approved / VDS Approved. The material of construction shall be as per this specification for item specified. For other items, the material of construction used in the system shall be in accordance.

CAS controller shall be provided with Ethernet ports to establish redundant communication with Station PLC (on different IP domain if required). Vendor shall provide necessary spare as per OISD/PNGRB/NFPA guidelines.

Vendor/contactor shall provide local clean agent control panel & provide necessary potential free contacts for fire detection from Local fire alarm panel & signal to PLC.

DATA SHEET FOR AUDIBLE ALARM - ADDRESSABLE					
GENERAL	1	Tag No.		-	
	2	Location/Service		Refer attached Drawing	
	3	Quantity		Refer attached Drawing	
	4	Hazardous area classification		Safe Area/ Weatherproof	
DEVICE DATA	5	Type		Solid State Electronic Type	
	6	Detector Operating Method		Multi Tone Type	
	7	Detection Coverage / Range		85 dBA for Outdoor @1 meter	
	8	Tone		On-Off modulating tone for Pre-alarm & Continuous for main alarm	
	9	Tone Selection		Required	
	10	Volume Control		Adjustable	
	11	EOL & Series Resistor		-	
	12	SIL certification		-	
	13	Addressable		Yes (Note 10)	
ELECTRICAL REQUIREMENT	14	Hazardous Area Approval Certification		-	
	15	Certification		UL/FM/Vds/LPCB	
	16	Supply Voltage		24 VDC	
	17	Power Consumption		VTA	
	18	Cable Entry		1/2" NPT, 2 Nos. (Note 9)	
	19	Wiring configuration		2 Wire	
ENCLOSURE	20	Enclosure Material		Polycarbonate	
	21	Enclosure Color		-	
	22	Dimensions		VTA	
	23	Weight		VTA	
	24	Mounting		Surface mounting	
	25	Mounting Accessories		Note 7	
ENVIRONMENTAL REQUIREMENT	26	Ambient Temperature	ºC	0	50
	27	Humidity (Min/Max)	%	5% RH	95% RH
	28	Air Velocity	Km/Hr.		
OTHER	29	Weather Protection Cover/ Splash Guard		-	
	30	Ingress Protection Rating		IP 42 minimum	
PURCHASE	31	Manufacturer		VTA	
	32	Model		VTA	
REV.0		CHECKED BY		APPROVED BY	

GENERAL NOTES FOR AUDIBLE ALARM

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System.
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. Fire and Gas detectors shall be painted as per painting Specification.
4. The Audible alarm (for field area) hardware shall be protected against surges, transients induced either by switching of heavy electrical loads or lightning. Compatible external surge protectors with necessary mounting accessories shall be included in the offer. The same shall be suitable for installation in hazardous area Zone-1, Gas Gr. IIA/IIB, T3. These external Surge arrestors / Transient protection devices shall have valid PESO certificate.
5. All spare cable entries shall be fitted with Ex'd'/Ex'e' dual certified, nickel-plated brass sealing plugs for F&G devices located in field.
6. The cable glands shall be double compression type made of Nickel-plated brass material, suitable for Zone 1, Group IIA / IIB, T3, Weather proof to IP 65 minimum, PESO certified and dual certified Ex'd'/Ex'e' for F&G devices located in field.
7. All applicable mounting accessories shall be of SS 316 and in Vendor's scope of supply along with cable gland.
8. RFI / EMI immunity shall be as per IEC 61000.
9. Cable Gland shall be suitable for installation on armored cables. Spare cable entries shall be fitted with nickel plated brass sealing plugs for F&G devices located inside building.
10. Addressable modules (if required) shall be considered in vendor's scope of supply.
11. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.

DATA SHEET FOR VISUAL ALARM - ADDRESSABLE					
GENERAL	1	Tag No.			
	2	Location/Service		Refer attached Drawing	
	3	Quantity		Refer attached Drawing	
	4	Hazardous area classification		Safe Area/ Weatherproof	
DEVICE DATA	5	Type		Flashing Beacons	
	6	Flash Rate		60 Flashes per Minute	
	7	Dome Color		Red	
	8	Dome Assembly		Transparent Toughened Glass	
	9	Lamp Type		High Intensity Twin Xenon Discharge Type / LED - 5 Joule	
	10	Flash Tube Life		VTA	
	11	Effective Intensity		Up to 100 Cd, Selectable (VTA)	
	12	Lens Guard / Lens Protection Cover		Required	
	13	Cone of Vision		360°	
	14	EOL & Series Resistor		-	
	15	SIL certification		-	
	16	Addressable		Yes (Note 9)	
ELECTRICAL REQUIREMENT	17	Hazardous Area Approval Certification		-	
	18	Certification		UL/FM/Vds/LPCB	
	19	Supply Voltage		24 VDC	
	20	Power Consumption		VTA	
	21	Cable Entry		1/2" NPT, 2 Nos. (Note 10)	
	22	Wiring configuration		2 Wire	
ENCLOSURE	23	Enclosure Material		Polycarbonate	
	24	Dimensions		VTA	
	25	Weight		VTA	
	26	Mounting		Surface mounting	
	27	Mounting Accessories		Note 7	
ENVIRONMENTAL REQUIREMENT	28	Ambient Temperature	ºC	0	50
	29	Humidity (Min/Max)	%	5% RH	95% RH
	30	Air Velocity	Km/Hr.		
OTHER	31	Weather Protection Cover/ Splash Guard		-	
	32	Ingress Protection Rating		IP 42 Minimum	
PURCHASE	33	Manufacturer		VTA	
	34	Model		VTA	
REV.0		CHECKED BY		APPROVED BY	

GENERAL NOTESFOR VISUAL ALARM

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System.
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. Fire and Gas detectors shall be painted as per painting Specification.
4. The Visual alarm (for field area) hardware shall be protected against surges, transients induced either by switching of heavy electrical loads or lightning. Compatible external surge protectors with necessary mounting accessories shall be included in the offer. The same shall be suitable for installation in hazardous area Zone-1, Gas Gr. IIA/IIB, T3. These external Surge arrestors / Transient protection devices shall have valid PESO certificate.
5. All spare cable entries shall be fitted with Ex'e'/Ex'd' dual certified, nickel-plated brass sealing plugs for F&G devices located in field.
6. The cable glands shall be double compression type made of Nickel-plated brass material, suitable for Zone 1, Group IIA / IIB, T3, Weather proof to IP 65 minimum, PESO certified and dual certified Ex'd'/Ex'e' for F&G devices located in field.
7. All applicable mounting accessories shall be of SS 316 and in Vendor's scope of supply along with cable gland.
8. RFI / EMI immunity shall be as per IEC 61000.
9. Addressable modules (if required) shall be considered in vendors scope of supply.
10. Cable Gland shall be suitable for installation on armored cables. Spare cable entries shall be fitted with nickel plated brass sealing plugs for F&G devices located inside building.
11. Lens shall be externally protected from mechanical damage by wire guard.
12. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.

DATA SHEET FOR MANUAL CALL POINT- NON-ADDRESSABLE					
GENERAL	1	Tag No.		-	
	2	Location/Service		Refer attached Drawing	
	3	Quantity		Refer attached Drawing	
	4	Hazardous area classification		Zone 1, Gr. IIA/ IIB, T3	
DEVICE DATA	5	Type		Break Glass type	
	6	Protection Flap		NA	
	7	Reset		Note 10	
	8	Switch Type		DPDT (VTA)	
	9	Breaking Device		Required	
	10	Spare Glass		Required (Minimum 2 Nos. with each MCP)	
	11	EOL & Series Resistor		Required, Value- VTA	
	12	SIL certification		-	
	13	Addressable		No	
	14	Output Signal		Potential Free contact	
	15	Contact Rating		24 V, 2A	
ELECTRICAL REQUIREMENT	16	Hazardous Area Approval Certification		PESO	
	17	Electrical Certification		Ex 'd'	
	18	Supply Voltage		24 VDC	
	19	Cable Entry		1/2" NPT, 2 Nos. (Note 5, 6)	
	20	Wiring Configuration		2 Wire	
ENCLOSURE	21	Housing Color		Red (RAL 3000)	
	22	Enclosure Material		Epoxy Coated Die Cast Aluminum	
	23	Dimensions		VTA	
	24	Weight		VTA	
	25	Mounting		Pipe Mounting / Wall Mounting	
	26	Mounting Accessories		Note 7	
ENVIRONMENTAL REQUIREMENT	27	Ambient Temperature	ºC	0	50
	28	Humidity (Min/Max)	%	5% RH	95% RH
	29	Air Velocity	Km/Hr.		
OTHER	30	Ingress Protection Rating		IP 65 minimum	
	31	Test Facility		Note 11	
PURCHASE	32	Manufacturer		VTA	
	33	Model		VTA	
REV.0		CHECKED BY		APPROVED BY	

DATA SHEET FOR MANUAL CALL POINT- ADDRESSABLE					
GENERAL	1	Tag No.		-	
	2	Location/Service		Refer attached Drawing	
	3	Quantity		Refer attached Drawing	
	4	Hazardous area classification		Safe Area/ Weatherproof	
DEVICE DATA	5	Type		Break Glass type	
	6	Protection Flap		NA	
	7	Reset		Note 10	
	8	Switch Type		DPDT (VTA)	
	9	Breaking Device		Required	
	10	Spare Glass		Required (Minimum 2 Nos. with each MCP)	
	11	EOL & Series Resistor		-	
	12	SIL certification		-	
	13	Addressable		Yes	
	14	Output Signal		-	
	15	Contact Rating		24 V, 2A	
ELECTRICAL REQUIREMENT	16	Hazardous Area Approval Certification		-	
	17	Certification		UL/FM/Vds/LPCB	
	18	Supply Voltage		24 VDC	
	19	Cable Entry		1/2" NPT, 2 Nos. (Note 12)	
	20	Wiring Configuration		2 Wire	
ENCLOSURE	21	Housing Color		Red (RAL 3000)	
	22	Enclosure Material		Epoxy Coated Die Cast Aluminum	
	23	Dimensions		VTA	
	24	Weight		VTA	
	25	Mounting		Wall Mounting	
	26	Mounting Accessories		Note 7	
ENVIRONMENTAL REQUIREMENT	27	Ambient Temperature (Min/Max)	ºC	0	50
	28	Humidity (Min/Max)	%	5% RH	95% RH
	29	Air Velocity	Km/Hr.		
OTHER	30	Ingress Protection Rating		IP 42 minimum	
	31	Test Facility		Note 11	
PURCHASE	32	Manufacturer		VTA	
	33	Model		VTA	
REV.0		CHECKED BY		APPROVED BY	

GENERAL NOTESFOR MANUAL CALL POINT

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System.
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. Fire and Gas detectors shall be painted as per painting Specification.
4. The Manual Call Points (for Field area) shall be protected against surges, transients induced either by switching of heavy electrical loads or lightning. Compatible external surge protectors with necessary mounting accessories shall be included in the offer. The same shall be suitable for installation in hazardous area Zone-1, Gas Gr. IIA/IIB, T3. These external Surge arrestors / Transient protection devices shall have valid PESO certificate.
5. All spare cable entries shall be fitted with Ex'e'/Ex'd' dual certified, nickel-plated brass sealing plugs.
6. The cable glands shall be double compression type made of Nickel-plated brass material, suitable for Zone 1, Group IIA / IIB, T3, Weather proof to IP 65 minimum, PESO certified and dual certified Ex'd'/Ex'e'.
7. All applicable mounting accessories shall be of SS 316 and in Vendor's scope of supply along with cable gland.
8. Manual Call point shall be engraved with "Break Glass in case of Fire" in white letters.
9. RFI / EMI immunity shall be as per IEC 61000.
10. When activated the Manual Alarm Call point shall stay in latched position and should not be resettable without proper suitable means.
11. The Manual call points shall be provided with a key operated test facility to enable periodic testing of the alarm contacts without the need to remove or break the glass.
12. Cable Gland shall be suitable for installation on armored cables. Spare cable entries shall be fitted with nickel plated brass sealing plugs for F&G devices located inside building.
13. Wherever '1' is specified under the column of 'REV', indicates the changes in data. For other tags the data of previous revision remain unchanged.
14. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.

DATA SHEET FOR PHOTOELECTRIC SMOKE DETECTOR- ADDRESSABLE						
GENERAL	1	Tag No.		-		
	2	Location/Service		Refer attached Drawing		
	3	Quantity		Refer attached Drawing		
	4	Hazardous area classification		Safe Area		
DEVICE DATA	5	Detector Operating Method		Optical type (Light scattering)		
	6	Detection Coverage / Range		Note 6		
	7	Sensitivity Obscuration per meter		VTA		
	8	Response Time		VTA		
	9	Start-up Time		VTA		
	10	Visual Indication		LED for Power ON & Alarm		
	11	Relay Contact Rating		-		
	12	EOL & Series Resistor		-		
	13	Reset		Automatic		
	14	Vibration Proof detector base		Required		
	15	SIL certification		-		
	16	Addressable		Yes		
ELECTRICAL REQUIREMENT	17	Hazardous Area Approval Certification		-		
	18	Certification		UL/FM/Vds/LPCB		
	19	Supply Voltage		24 VDC		
	20	Power Consumption		VTA		
	21	Cable Entry		1/2" NPT, 2 Nos.		
	22	Wiring configuration		2 Wire		
ENCLOSURE	23	Enclosure Material		Plastic (VTA)		
	24	Dimensions		VTA		
	25	Weight		VTA		
	26	Mounting		Surface mount		
	27	Mounting Accessories		Note 8		
ENVIRONMENTAL REQUIREMENT	28	Ambient Temperature	ºC	0	50	
	29	Humidity (Min/Max)	%	5% RH	95% RH	
	30	Air Velocity	Km/Hr			
OTHER	31	Weather Protection Cover/ Splash Guard				
	32	Ingress Protection Rating		IP 42 minimum		
	33	Test & Calibration Kit		As per SOR		
PURCHASE	34	Manufacturer		VTA		
	35	Model		VTA		
REV.0		CHECKED BY		APPROVED BY		

DATA SHEET FOR MULTICRITERIA SMOKE DETECTOR- ADDRESSABLE					
GENERAL	1	Tag No.		-	
	2	Location/Service		Refer attached Drawing	
	3	Quantity		Refer attached Drawing	
	4	Hazardous area classification		Safe Area	
DEVICE DATA	5	Detector Operating Method		(i) For Smoke Optical type (Light scattering) (ii) For Heat-Temperature Dependent Resistance	
	6	Detection Coverage / Range		Note 6	
	7	Sensitivity Obscuration per meter		VTA	
	8	Response Time		VTA	
	9	Start-up Time		VTA	
	10	Visual Indication		LED for Power ON & Alarm	
	11	Relay Contact Rating		-	
	12	EOL & Series Resistor		-	
	13	Reset		Automatic	
	14	Vibration Proof detector base		Required	
	15	SIL certification		-	
	16	Addressable		Yes	
ELECTRICAL REQUIREMENT	17	Hazardous Area Approval Certification		-	
	18	Certification		UL/FM/Vds/LPCB	
	19	Supply Voltage		24 VDC	
	20	Power Consumption		VTA	
	21	Cable Entry		1/2" NPT, 2 Nos.	
	22	Wiring configuration		2 Wire	
ENCLOSURE	23	Enclosure Material		Plastic (VTA)	
	24	Dimensions		VTA	
	25	Weight		VTA	
	26	Mounting		Surface mount	
	27	Mounting Accessories		Note 8	
ENVIRONMENTAL REQUIREMENT	28	Ambient Temperature	ºC	0	50
	29	Humidity (Min/Max)	%	5% RH	95% RH
	30	Air Velocity	Km/Hr		
OTHER	31	Weather Protection Cover/ Splash Guard			
	32	Ingress Protection Rating		IP 42 minimum	
	33	Test & Calibration Kit		As per SOR	
PURCHASE	34	Manufacturer		VTA	
	35	Model		VTA	
REV.0		CHECKED BY		APPROVED BY	

GENERAL NOTES FOR SMOKE DETECTOR

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System.
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. All spare cable entries shall be fitted with nickel plated brass sealing plugs.
4. Cable Gland shall be suitable for installation on armored cables.
5. RFI / EMI immunity shall be as per IEC 61000.
6. Area covered from a single detector shall comply the requirements of NFPA-72.
7. Vendor to advise on the detector calibration / test frequency (Period after which testing required).
8. All applicable mounting accessories required are in Vendor's scope of supply.
9. Smoke Detector shall be suitable for installation in HVAC/AHU Duct. Duct Mounting Kit along with sampling tube shall be provided.
10. The cable glands shall be double compression type made of Nickel-plated brass material, suitable for Zone 1, Group IIA / IIB, T3, Weather proof to IP 65 minimum, PESO certified and dual certified Ex'd'/Ex'e'.
11. Wherever '1' is specified under the column of 'REV', indicates the changes in data. For other tags the data of previous revision remain unchanged.
12. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.

HOLD-

1. HVAC Duct Size.

DATA SHEET FOR HEAT DETECTORS- RATE OF RISE (NON-ADDRESSABLE) FOR BATTERY ROOM					
GENERAL	1	Tag No.		-	
	2	Location/Service		Refer attached Drawing	
	3	Quantity		Refer attached Drawing	
	4	Hazardous area classification		Zone 1, Gr. IIC, T3	
DEVICE DATA	5	Type		Rate of Rise in Temperature	
	6	Detector Operating Method		Differential Temperature Measurement (Thermistors)	
	7	Output		Contact Relay Output	
	8	EOL & Series Resistor		Required, Value-VTA	
	9	Relay Contact Rating		24 V, 2A	
	10	LED Alarm Indication		LED for Alarm / Normal / Fault	
	11	Detection Coverage		VTA	
	12	Vibration Proof detector base			
	13	Actuation temperature		6.7 to 8.3 ^{O}C / Min. (VTA)	
	14	Response Time		VTA	
	15	Start-up Time		VTA	
	16	Alarm Reset		Automatic	
	17	SIL certification		SIL 2	
	18	Addressable		No	
ELECTRICAL REQUIREMENT	19	Hazardous Area Approval Certification		PESO	
	20	Electrical Certification		Ex 'i'	
	21	Supply Voltage		24 VDC	
	22	Power Consumption		VTA	
	23	Cable Entry		1/2" NPT, 2 Nos. (Note 5, 11)	
	24	Wiring Configuration		2 wire	
ENCLOSURE	25	Enclosure Material		Epoxy Coated Die Cast Aluminum	
	26	Color		VTA	
	27	Dimensions		VTA	
	28	Weight		VTA	
	29	Mounting		Pipe / Wall Mounting	
	30	Mounting Accessories		Note 7	
ENVIRONMENTAL REQUIREMENT	31	Ambient Temperature	ºC	0	50
	32	Humidity (Min/Max)	%	5% RH	95% RH
	33	Air Velocity	Km/Hr		
OTHER	34	Weather Protection Cover/ Splash Guard		Required	
	35	Ingress Protection Rating		IP 65 minimum	
	36	Test & Calibration Kit		As per SOR	
PURCHASE	37	Manufacturer		VTA	
	38	Model		VTA	

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GENERAL NOTES FOR HEAT DETECTOR (RATE OF RISE)

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System.
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. Fire and Gas detectors shall be painted as per painting Specification.
4. Surge/Transient protection to be provided for all electronic Instruments in the field. Compatible external surge protectors with necessary mounting accessories shall be included in the offer. The same shall be suitable for installation in hazardous area Zone-1, Gas Gr. IIA/IIB, T3. These external Surge arrestors / Transient protection devices shall have valid PESO certificate.
5. All spare cable entries shall be fitted with Ex'd'/Ex'e' dual certified, nickel-plated brass sealing plugs.
6. The cable glands shall be double compression type made of Nickel-plated brass material, suitable for Zone 1, Group IIA / IIB, T3, Weather proof to IP 65 minimum, PESO certified and dual certified Ex'd'/Ex'e'.
7. All applicable mounting accessories shall be of SS 316 and in Vendor's scope of supply.
8. RFI / EMI immunity shall be as per IEC 61000.
9. Vendor to advise on the detector calibration / test frequency (Period after which testing required).
10. Cable Gland shall be suitable for installation on armored cables. Spare cable entries shall be fitted with nickel plated brass sealing plugs for F&G devices located inside building.
11. The cable glands shall be double compression type made of Nickel-plated brass material, suitable for Zone 1, Group IIC, T3, Weather proof to IP 65 minimum, PESO certified and dual certified Ex'd'/Ex'e' for F&G devices located inside Battery Room.
12. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.

DATA SHEET FOR HEAT DETECTORS (FIXED TEMPERATURE) - ADDRESSABLE						
GENERAL	1	Tag No.				
	2	Location/Service		Pantry Room (Inside Control/Office Building)		
	3	Quantity		Refer attached Drawing		
	4	Hazardous area classification		Safe Area		
DEVICE DATA	5	Type		Fixed Temperature		
	6	Detector Operating Method		Temperature sensitive resistance		
	7	Output		-		
	8	EOL & Series Resistor		-		
	9	Relay Contact Rating		24 V, 2A		
	10	LED Alarm Indication		LED for Alarm / Normal / Fault		
	11	Detection Coverage		VTA		
	12	Vibration Proof detector base		Required		
	13	Actuation temperature		68°C (VTA)		
	14	Response Time		VTA		
	15	Start-up Time		VTA		
	16	Alarm Reset		Automatic		
	17	SIL certification		-		
	18	Addressable		Yes		
ELECTRICAL REQUIREMENT	19	Hazardous Area Approval Certification		-		
	20	Certification		UL/FM/Vds/LPCB		
	21	Supply Voltage		24 VDC		
	22	Power Consumption		VTA		
	23	Cable Entry		1/2" NPT, 2 Nos.		
	24	Wiring Configuration		2 wire		
ENCLOSURE	25	Enclosure Material		Plastic (VTA)		
	26	Color		VTA		
	27	Dimensions		VTA		
	28	Weight		VTA		
	29	Mounting		Surface Mounting		
	30	Mounting Accessories		Note 6		
ENVIRONMENTAL REQUIREMENT	31	Ambient Temperature	ºC	0	50	
	32	Humidity (Min/Max)	%	5% RH	95% RH	
	33	Air Velocity	Km/Hr.			
OTHER	34	Weather Protection Cover/ Splash Guard				
	35	Ingress Protection Rating		IP 42 minimum		
	36	Test & Calibration Kit		As per SOR		
PURCHASE	37	Manufacturer		VTA		
	42	Model		VTA		

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GENERAL NOTES FOR HEAT DETECTOR (FIXED TEMPERATURE)

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System.
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. Fire and Gas detectors shall be painted as per painting Specification.
4. All spare cable entries shall be fitted with nickel plated brass sealing plugs.
5. Cable Gland shall be suitable for installation on armored cables.
6. All applicable mounting accessories required are in Vendor's scope of supply.
7. RFI / EMI immunity shall be as per IEC 61000.
8. Vendor to advise on the detector calibration / test frequency (Period after which testing required).
9. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.

DATA SHEET FOR LINEAR HEAT SENSING CABLE							
GENERAL	1	Tag No.			-		
	2	Location/Service			Cable Trench, Cable Seller		
	3	Quantity			Refer attached Drawing		
	4	Hazardous area classification			Safe Area		
DEVICE DATA	5	Type			Linear Heat Sensing Cable		
	6	Sensor Length			As per SOR/Approved Drawing		
	7	Sensing Shell & Mounting Head			NA		
	8	Response Time			VTA		
	9	Temperature Set Point			70°C		
	10	Output			Contact Close on Alarm (Note 4)		
	11	Normal	Warning		Note 4		
	12	Alarm	Fault		Note 4		
	13	Alarm Reset			NA		
	14	Outer Jacket Material			PVC		
	15	Insulation material			VTA		
	16	SIL certification			NA		
	17	Addressable			Yes (Note 7)		
ELECTRICAL REQUIREMENT	18	Hazardous Area Approval Certification					
	19	Certification			UL/FM/Vds/LPCB		
	20	Supply Voltage			24 VDC		
	21	Power Consumption			VTA		
	22	Cable Entry			1/2" NPT, 2 Nos.		
	23	Wiring Configuration			2-Wire		
ENCLOSURE	24	Enclosure Material			NA		
	25	Color			VTA		
	26	Dimensions			VTA		
	27	Weight			VTA		
	28	Mounting			Note 5		
	29	Mounting Accessories			Note 5		
ENVIRONMENTAL REQUIREMENT	30	Ambient Temperature		ºC	0		50
	31	Humidity (Min/Max)		%	5% RH		95% RH
	32	Air Velocity		Km/Hr.			
OTHER	33	Weather Protection Cover/ Splash Guard					
	34	Ingress Protection Rating			Note 7		
PURCHASE	35	Manufacturer			VTA		
	36	Model			VTA		
REV.0		CHECKED BY			APPROVED BY		

GENERAL NOTES FOR LINEAR HEAT SENSING CABLE

Notes: NA - Not applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. Fire and Gas detectors shall be painted as per painting Specification.
4. Cable type is twin conductor heat sensing cable, causing short circuit in alarm condition.
5. Linear heat sensing cable shall be supplied with all required mounting & installation accessories.
6. All spare cable entries shall be fitted with sealing plugs.
7. Addressable module, Junction boxes required to complete the addressable loop shall be considered by vendor in his scope of supply. It shall be minimum IP-42.
8. Cable Gland shall be suitable for installation on armored cables.
9. RFI / EMI immunity shall be as per IEC 61000.
10. Linear heat sensing cable dimensions & weight shall be confirmed by vendor during detailed engineering.
11. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.

DATA SHEET FOR FIRE ALARM PANEL					
GENERAL	1	Tag No.		-	
	2	Quantity		As per Enclosed Drawings	
	3	Location/Service		As per Enclosed Drawings	
Fire Alarm Panel	4	Type		Microprocessor based Addressable Digital fire Alarm panel with Redundant TCP/ IP Modbus communication Module	
	5	Manual Alarm Reset		Required	
	6	Alarm Indication		Required	
	7	Power On Indication		Required	
	8	Supply Voltage		240VAC, 50HZ, UPS SUPPLY	
	9	Wiring		Note 10 & 11	
	11	Operating Voltage		24 V DC (through Battery)	
	12	Relay outputs		Required (Note 12)	
	13	Visual Display		LCD Display (Note 8)	
	14	Front Panel Control		Required	
	15	Power consumption		VTA	
	16	Mounting		Note 15	
	17	Design & Testing conformity		Required	
	18	Ingress Protection		IP 42	
	19	Area Classification		Safe Area	
	20	Certification		UL/FM/Vds/LPCB	
	21	Storage Temperature		VTA	
	22	Operating Temperature		0 - 50°C	
	23	Humidity (Min/Max)	%	5% RH	95% RH
	24	Dimensions (WxHxD)		Note 15	
	25	Weight of FACP		VTA	
	26	Material of FACP		Powder coated steel (VTA)	
	27	No. of addressable loops		4 Loops minimum (interdependent for detectors & annunciators.)	
	28	No. of addressable devices/loop		99 minimum (VTA)	
	29	LFAP Looping Cable		Note 12	
	30	SIL Certification		NA	
OPTIONS	31	Mounting Accessories		Note 5	
	32	Cable entry for Panel		From Bottom side	
	33	Enclosure for Battery		Required, inside the LFAP panel	
	34	Size of Battery Enclosure (W x H x D)		VTA	
	35	Tag Plate		Required	
PURCHASE	36	Manufacturer		VTA	
	37	Model		VTA	

BATTERY	38	Type	SMF Battery
	39	Make	VTA
	40	Voltage	12 VDC
	41	Weight	VTA
	42	Capacity	VTA
	43	Backup	48 Hrs. in Normal Condition 1 Hr. in Alarm Condition
	44	Location	In built in Fire Alarm Panel
REV.0		CHECKED BY	APPROVED BY

GENERAL NOTES FOR FIRE ALARM PANEL

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. The LFPA shall complying to the requirements as per NFPA-72 & shall be UL/FM/Vds/LPCB certified.
4. The LFAP shall communicate with Station PLC and RTU at each station over redundant MODBUS TCP/ IP communication link in addition to hardwired/IOs interfacing. Accordingly, minimum 4 nos. MODBUS TCP/ IP communication ports shall be provided in each fire alarm panel.
5. Battery back-up shall be provided as per TS. Vendor shall provide battery sizing calculations for EPCM review.
6. Loss of primary power at the Fire Alarm Control panel shall initiate a trouble signal at the Station PLC over MODBUS TCP/ IP communication link. An emergency power light shall be illuminated at both locations when the system is operating on the secondary power supply i.e., on the battery back-up.
7. The response time of complete fire alarm system shall be confirmed by vendor.
8. The LFAP panel shall have LCD screen & Status LEDs to display a fire zone.
9. The LFAP system shall be able to automatically detect and report open circuit, short circuit & ground fault of wiring. These alarms will be provided to Station PLC over serial link.
10. Dedicated terminal boards shall be provided inside LFAP panel for Looping cables connections, Power supply cable connections, Serial cable connections, Battery test terminals etc. Wiring termination directly on addressable modules / relay boards shall not be permitted.
11. Hardwired input/outputs shall be provided as per the I/O list for respective LFAP panels.
12. The LFAP panels at each station shall be able to communicate in a ring with each other & with repeater panels. Vendor shall confirm the communication protocol for the same. The looping cable shall be supplied by composite works / laying contractor.
13. UPS power supply connection shall be considered with MCB, surge protectors at LFAP panel end. Surge protector to be provided for Loop In & Out cables also for protection from external surges.
14. Vendor shall provide 1 no. of repeater panel in security room. It shall be of Wall mounted type.
15. Fire Alarm Panel shall be full height, free standing cabinet with glass door. Panel size shall be preferably 800mm (W) x 2100mm (H) x 800mm (D) in Control Room. Fire Alarm Panel in Substation shall be of Wall Mounted type.
16. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.
17. Necessary power supply converters shall be provided by the vendor inside the fire alarm panel to get the desired voltage level.
18. Necessary ethernet switch as required for communication shall be provided by the vendor.

DATA SHEET FOR REPEATER PANEL					
GENERAL	1	Tag No.		-	
	2	Quantity		As per Enclosed Drawings	
	3	Location/Service		As per Enclosed Drawings	
Fire Alarm Panel	4	Type		Microprocessor based addressable Digital panel with alphanumeric keypad for the field programming and control of the fire alarm system	
	5	Manual Alarm Reset		Required	
	6	Alarm Indication		Required	
	7	Power On Indication		Required	
	8	Supply Voltage		240VAC, 50HZ, UPS SUPPLY	
	9	Wiring		Note 4	
	11	Operating Voltage		24 V DC (through Battery)	
	12	Relay outputs		Required (Note 12)	
	13	Visual Display		LCD Display (Note 8)	
	14	Front Panel Control		Required	
	15	Power consumption		VTA	
	16	Mounting		Note 11	
	17	Design & Testing conformity		Required	
	18	Ingress Protection		IP 42	
	19	Area Classification		Safe Area	
	20	Certification		UL/FM/Vds/LPCB	
	21	Storage Temperature		VTA	
	22	Operating Temperature		0 - 50°C	
	23	Humidity (Min/Max)	%	5% RH	95% RH
	24	Dimensions (WxHxD)		Note 11	
	25	Weight of FACP		VTA	
	26	Material of FACP		Powder coated steel (VTA)	
	27	No. of addressable loops		4 Loops minimum (interdependent for detectors & annunciators.)	
	28	No. of addressable devices/loop		99 minimum (VTA)	
	29	Looping Cable		Note 10	
	30	SIL Certification		NA	
OPTIONS	31	Mounting Accessories		Note 5	
	32	Cable entry for Panel		From Bottom side	
	33	Enclosure for Battery		Required, inside the LFAP panel	
	34	Size of Battery Enclosure (W x H x D)		VTA	
	35	Tag Plate		Required	
PURCHASE	36	Manufacturer		VTA	
	37	Model		VTA	

BATTERY	38	Type	SMF Battery
	39	Make	VTA
	40	Voltage	12 VDC
	41	Weight	VTA
	42	Capacity	VTA
	43	Backup	48 Hrs. in Normal Condition 1 Hr. in Alarm Condition
	44	Location	In built in the Repeater Panel
REV.0		CHECKED BY	APPROVED BY

GENERAL NOTES FOR FIRE ALARM PANEL

Notes: NA - Not Applicable, VTA - Vendor to Advise.

1. Datasheet shall be read in conjunction with PJS & Technical Specification for Fire Alarm Detection System
2. 316SS tags stamped with Tag No. in 15 mm characters shall be permanently attached using 316SS screws or wire.
3. The Repeater Panel shall comply to the requirements as per NFPA-72 & shall be UL/FM/Vds/LPCB certified.
4. The LFAP shall communicate with Fire Alarm Panel through MODBUS TCP/ IP communication in addition to hardwired/IOs interfacing. Necessary media converters, optical patch cords, etc. all accessories as required for communication shall be provided by the vendor at both ends of the communication link.
5. Repeater Alarm Panel shall be provided with alphanumeric keypad for the field programming and control of the fire alarm system
6. Battery back-up shall be provided as per TS. Vendor shall provide battery sizing calculations for EPMC review.
7. The response time of complete fire alarm system shall be confirmed by vendor.
8. Repeater panels shall have LCD screen & Status LEDs to display a fire zone.
9. The LFAP panels at each station shall be able to communicate with each other & with repeater panels. Vendor shall confirm the communication protocol for the same.
10. UPS power supply connection shall be considered with MCB, surge protectors at LFAP panel end. Surge protector to be provided for Loop In & Out cables also for protection from external surges.
11. Repeater panel in security room shall be of Wall mounted type. Wall mounted Repeater panels shall be mounted not more than 1500 mm above the finished floor. Panel size shall be preferably 300mm (W) x 350mm (H) x 90mm (D)
12. Cable glands as required and sealing plugs corresponding to the area classification shall in scope of supply of the vendor.
13. Necessary power supply converters shall be provided inside the repeater panel to get the desired voltage level.

DATASHEET FOR 2 x 1.5 MM2 CU. ARMOURED FRLS CABLE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.00	MANUFACTURER				
2.00	TYPE OF CABLE			SIGNAL	
3.00	CONDUCTOR TYPE			STRANDED PLANE COPPER	
4.00	CONDUCTOR STANDS / DIA mm			8130/84	
5.00	INSULATION MATERIAL			HR PVC TYPE C	
6.00	INSULATION THICKNESS MM			0.6	
7.00	INSULATION CORE COLOURS			BLUE - BLACK - BROWN	
8.00	INNER JACKETED MATERIAL			PVC FRLS	
9.00	INNER JACKETED MATERIAL THICKNESS MM			0.3	
10.00	INNER JACKETED MATERIAL COLOUR			BLACK	
11.00	MAXIMUM DC RESISTANCE OF CONDUCTOR OHM / KM			12.1	
12.00	OUTER JACKETED MATERIAL			PVC FRLS	
13.00	OUTER JACKETED MATERIAL THICKNESS MM			1.24 (MIN)	
14.00	OUTER JACKETED MATERIAL COLOUR			RED	
15.00	ARMOUR TYPE			G.I. STELL / WIRE	
16.00	ARMOUR DIV / THICKNESS MM			0.9	
17.00	INSULATION RESISTANCE MOHM / KM			10	
18.00	OVER ALL DIAMETER ± 2 MM			12	
19.00	APPROXIMATE WEIGHT OF CABLE KG/KM			275	
20.00	MUTUAL CAPACITANCE NF/KM			<250	
21.00	INSULATION RESISTANCE MOHM/KM			10	
22.00	SCREEN			ALUMINIUM MYLAR TAPE	
23.00	APPROVALS / ACCEPTANCES			TEST CERTIFICATE	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR GAS RELEASE PANEL					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	NAME OF EQUIPMENT			GAS RELEASE PANEL	
1.02	TYPE			ADDRESSABLE	
2.00	**MANUFACTURING DETAILS**				
2.01	MAKE				
2.02	MODEL				
2.03	MANUFACTURING STANDARD				
2.04	MIMIC PANEL			REQUIRED	
3.00	**OPERATING**				
3.01	OPERATING VOLTAGE			AC : 230V, 50 Hz	
3.02	CURRENT IN NORMAL CONDITION CURRENT IN ALARM CONDITION			350MA 900MA (WITHOUT LOAD)	
3.03	SYSTEM VOLTAGE			24 VDC	
3.04	BATTERY CHARGING VOLTAGE			24-30 VDC	
3.05	ALARM CURRENT			9-32 Ma	
3.06	SHORT CIRCUIT CURRENT			40 mA Max.	
4.00	**BATTERY**			LEAD ACID MAINTENANCE FREE	
5.00	**OTHER FEATURES**				
5.01	TYPE OF MOUNTING			WALL	
5.02	DIMENSIONS				
5.03	COLOR				
5.04	PROTECTION			AS PER IP50	
5.05	CABLE ENTRY			BOTTOM	
5.06	APPLICATION			INDOOR	
5.07	HUMIDITY RANGE			85% NON CONDENSING	
5.08	TEMPERATURE RANGE			MAX 50˚C	
5.09	COMMUNICATION OUTPUT			RS 485 / MODBUS	
6.00	**MATERIAL OF CONSTRUCTION**				
6.01	BODY			18 SWG CRCA SHHET (POWDER COATED)	
6.02	DOOR THICKNESS				
6.03	GLAND PLATE THICKNESS				
6.04	BODY THICKNESS				
6.05	COLOR				
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR HOOTER WITH FLASHER					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	NAME OF EQUIPMENT			HOOTER WITH FLASHER	
2.00	**MANUFACTURING DETAILS**				
2.01	MAKE				
2.02	MODEL				
3.00	**OTHER FEATURES**				
3.01	DIMENSIONS				
3.02	OPERATING VOLTAGE			16 TO 33 VDC	
3.03	INPUT TERMINAL WIRE GUAGE			12 AWG TO 18AWG	
3.04	CABLE ENTRY			20MM DIA	
3.05	STROBE FLASH RATE			1 FLASH PER SEC	
3.06	COLOUR			RED	
3.07	TYPE OF MOUNTING			WALL MOUNT	
3.08	STANDARD OPERATING TEMPRATURE			-10˚ TO 55˚ C	
3.09	HUMIDITY RANGE			10% TO 93 NON CONDENSING	
3.10	LOCATION			IN DOOR	
3.11	AUDIABLE RANGE			88+ dba AT 16 volts	
4.00	APPROVALS / ACCEPTANCES			TEST CERTIFICATE	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR DISCHARGE NOZZLE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	ITEM DESCRIPTION			DISCHARGE NOZZLE	
1.02	MAKE				
1.03	MATERIAL			Brass	
1.04	SIZE			As per Calculation	
1.05	COVERAGE			360º, min. 7 mtr radius	
1.06	INSIDE DIA.				
1.07	OUTSIDE DIA				
1.08	LENGTH				
1.09	NOZZLE ORIFICE			AS PER THE SOFTWARE CALCULATION	
1.10	WORKING PRESSURE			60 BAR	
1.11	THREAD			NPT	
1.12	APPROVAL AGENCY			UL / FM / LPCB / VDS	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR CYLINDER & VALVE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	ITEM DESCRIPTION			IG CYLINDER (PESO Approved)	
1.02	MAKE				
1.03	SIZE				
2.00	**CHRACTERISTICS TECNICAS / TECHNICAL CHARACTERISTICS**				
2.01	WORKING PRESSURE			300 BAR.	
2.02	Test / Design Pressure (Min)			450 BAR.	
2.03	Cylinder Water Capacity				
3.00	**MATERIALES DE CONSTRUCCION / BUILDING MATERIALS**				
3.01	Cylinder			Seamless Steel	
3.02	Cylinder Valve			BRASS / SS316	
3.07	APPROVAL AGENCY			UL / FM / LPCB / VDS & PESO	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR DISCHARGE HOSE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	ITEM DESCRIPTION			DISCHARGE HOSE	
1.02	MAKE				
1.03	SIZE			1 1/2" Ø	
1.04	PART NO.				
2.00	**TECHNICAL CHARACTERISTICS**				
2.01	WORKING PRESSURE			60 BAR.	
2.02	WORKING TEMPERATURE			-20ºC TO 50ºC	
2.03	MAX. WORKING PRESSURE			130 BAR.	
2.04	TESTING PRESSURE				
2.05	APPROVAL AGENCY			UL / FM / LPCB / VDS	
2.06	HOSE			SYNTHETIC RUBBER	
2.07	FITTINGS			STEEL WITH ZINC PLATING	
2.08	BORE (MIN)				
2.09	END CONNECTIONS				
2.10	LENGTH				
3.00					
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR PRESSURE SWITCH					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	NAME OF EQUIPMENT			PRESSURE SWITCH	
1.02	MAKE				
1.03	MODEL NO.				
1.04	BODY				
1.05	DIAPHRAGM				
1.06	SET PRESSURE			2 BAR	
1.07	OVER LOAD PRESSURE			70 BAR	
1.08	IP RATING			IP 65	
1.09	OPERATING TEMPERATURE			-10^0C TO + 50^0C	
1.10	APPROVALS			UL/VDS/FM//LPCB	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR PRESSURE GAUGE WITH PRESSURE SWITCH					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	NAME OF EQUIPMENT			PRESSURE SWITCH	
1.02	MAKE				
1.03	MODEL NO.				
1.04	Pressure Range			0 –400 Bar	
1.05	IP Rating			IP 65	
1.06	Voltage			4.5 – 24 VDC / VAC	
1.07	Current			5 – 100 mA	
1.08	IP RATING			IP 65	
1.09	Power				
1.10	Set Pressure			270 + 5 Bar	
1.11	Contact			NO NC	
1.12	APPROVALS			UL/VDS/FM//LPCB	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR PRESSURE CONTROLLER					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	NAME OF EQUIPMENT			PRESSURE CONTROLLER	
1.02	MAKE				
1.03	MODEL NO.				
1.04	BODY			BRASS / SS	
1.05	INLET PRESSURE			300 BAR	
1.06	OUTLET PRESSURE			60 BAR	
1.07	MAXIMUM INLET PRESSURE			360 BAR	
1.08	INLET & OUTLET CONNECTION				
1.09	OPERATING TEMPERATURE			-10^0C TO + 50^0C	
1.10	APPROVALS			UL/VDS/FM//LPCB	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR SELECTOR / DIVERTER VALVE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	NAME OF EQUIPMENT			SELECTOR /DIVERTER VALVE	
1.02	MAKE				
1.03	MODEL NO.				
1.04	BODY			BRASS / SS	
1.05	PNEUMATIC ACTUATOR WORKING PRESSURE			7 -8 BAR	
1.06	WORKING PRESSURE (MAX)			60 BAR	
1.07	SOLENOID VALVE				
	VOLTAGE			24VDC, 2W	
	OPERATING PRESSURE			7-8 BAR	
	OPERATING TEMPERATURE			-25 0C TO +60 0C	
	IP RATING			IP 65	
1.08	POSITION INDICATOR				
1.09	VALVE POSITION				
1.10	MANUAL OPERATION				
1.11	WEIGHT				
1.12	APPROVALS			UL/VDS/FM//LPCB	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR FOR SCHEDULE 80 SEAMLESS PIPE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	ITEM DESCRIPTION			PIPES	
1.02	TYPE			SCHEDULE 80	
2.00	**MANUFACTURING DETAILS**				
2.01	MAKE				
2.02	BODY MATERIAL			ASTM A106 GR. B	
2.03	MAIN DIMENSION			O.D. (mm) : 88.90	
2.04	HYDROSTATIC TEST			2500 PSI	
3.00	**MATERIAL**				
3.01	PROCESS OF MANUFACTURE			ELECTRIC ARC FURNACE	
3.02	FULLY KILLED / RIMMED / SEMI-KILLED			FULLY KILLED	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR SAFETY VALVE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	ITEM DESCRIPTION			SAFETY VALVE	
1.02	MAKE				
1.03	SIZE			1/2" BSP	
1.04	MATERIAL			BRASS	
1.05	CONNECTOR			BRASS	
1.06	BRUST PRESSURE			63 KG.	
1.07	RUPTURE DISC			COPPER	
1.08	APPROVALS / ACCEPTANCES			TEST CERTIFICATE	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR RIGID HOSE DIA 1 ½”					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	ITEM DESCRIPTION			RIGID HOSE	
1.02	MAKE				
1.03	SIZE			1 1/2" Ø	
1.04	PART NO.				
2.00	**TECHNICAL CHARACTERISTICS**				
2.01	WORKING PRESSURE			300 BAR.	
2.02	WORKING TEMPERATURE			-20ºC - 120ºC	
2.03	HYDRAULIC TEST			450 BAR.	
2.04	TESTING PRESSURE			450 BAR.	
2.05	APPROVAL AGENCY			UL / FM / LPCB / VDS	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR MANUAL ABORT					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	NAME OF EQUIPMENT			MANUAL ABORT	
1.02	TYPE			CONVENTIONAL / DEAD MAN TYPE	
2.00	**MANUFACTURING DETAILS**				
2.01	MAKE				
2.02	MODEL				
2.03	MANUFACTURING STANDARD			EN54 PART-11	
3.00	**PRINCIPLE**				
3.01	MANUAL CALL POINT PRINCIPLE			PRESS-TYPE RE-SETTABLE	
4.00	**OPERATING**				
4.01	OPERATING VOLTAGE			30VDC MAX	
5.00	**OTHER FEATURES**				
5.01	TYPE OF MOUNTING			SURFACE	
5.02	WEIGHT			110G FLUSH , 160G SURFACE	
5.03	OPERATING TEMPRATURE			-10˚ TO 55˚ C	
5.04	HUMIDITY			0-95% NON CONDENSING	
5.05	COLOR			YELLOW	
6.00	APPROVALS / ACCEPTANCES			TEST CERTIFICATE	
	CHECKED BY		APPROVED BY		REV. 0

DATA SHEET FOR CHECK VALVE					
SR. NO.	**DESCRIPTION**			**TECHNICAL SPECIFICATION**	
1.00	**MATERIAL IDENTIFICATION**				
1.01	ITEM DESCRIPTION			CHECK VALVE	
1.02	MAKE				
2.00	**MATERIAL**				
2.01	BODY			GALVANISED STEEL	
2.02	SIZE			2" Ø	
2.03	INNER PISTON			BRASS	
2.04	THREADS			ACCORDING TO ISO 228	
	CHECKED BY		APPROVED BY		REV. 0

APPENDIX-IV

INSPECTION CATEGORIZATION PLAN FOR FIRE FIGHTING ITEMS

SI. No.	Item Description	Unit	Inspection Category TPIA	Inspection Category Contractor	Inspection Category PMC
1.0	**Fire Fighting**				
1.1	CO_2 Extinguisher	Nos.	C	N/A	C
1.2	DCP Extinguisher	Nos.	C	N/A	C
1.3	Clean agent type fire extinguisher	Nos.	C	N/A	C
1.4	Fire Suppression Clean agent system	LS	B	N/A	C
1.5	Fire Detection and Alarm System	LS	B	N/A	C
1.6	Linear heat sensing cable	Mtrs.	C	N/A	C
1.7	FRLS cables	Mtrs.	C	N/A	C
1.8	Assorted Pipes	Mtrs.	B	N/A	C
1.9	Flanges	Nos.	B	N/A	C
1.10	Fittings	Nos.	B	N/A	C
1.11	Valves	Nos.	A	N/A	B
1.12	Strainer	Nos.	B	N/A	B
1.13	Studs	Lot	C	N/A	C
1.14	Gaskets	Nos.	C	N/A	C
1.15	Water Monitor	Nos.	B	N/A	C
1.16	Water Cum Foam Monitor	Nos.	B	N/A	C
1.17	High-Volume Long-Range Monitor	Nos.	A	N/A	B
1.18	Double Headed Hydrant Valve	Nos.	B	N/A	C
1.19	Hose Pipe	Nos.	B	N/A	C
1.20	Instantaneous Male & Female Coupling	Nos.	C	N/A	C
1.21	Hose Reel	Nos.	B	N/A	C
1.22	Hose Cabinet	Nos.	C	N/A	C

1.23	Branch Pipe with Nozzle	Nos.	C	N/A	C
1.24	Deluge Valve and Accessories	Nos.	B	N/A	B
1.25	Spray Nozzle	Nos.	B	N/A	C
1.26	QBD Nozzle	Nos.	B	N/A	C
1.27	Orifice Plate	Nos.	C	N/A	C
1.28	Chain Pulley Block	Nos.	B	N/A	C
1.29	Wrapping Coating Material	RM	C	N/A	C
1.30	Pressure Safety Valve	Nos.	B	N/A	C
1.31	Fixed and Portable MEFG/HEFG	Nos.	B	N/A	C
1.32	ILBP	Nos.	B	N/A	C
1.33	AAAF Foam Solution	Nos.	C	N/A	C
1.34	Foam Tank	Nos.	B	N/A	C
1.35	Foam Pump	Nos.	A	N/A	B
1.36	Foam maker/Chamber with Vapour Seal Chamber	Nos.	B	N/A	C
1.37	Revolving Head/Branch Pipe	Nos.	B	N/A	C
1.38	Foam Deflector	Nos.	B	N/A	C
1.39	Fire Water Pumps Electric Driven & Diesel Driven	Nos.	A	N/A	B
1.40	Rim Seal Protection for Oil Storage Tank	Nos.	B	N/A	B
1.41	Mechanical Seal for Oil Storage Tank	Nos.	B	N/A	B

A - Stage-wise Inspection + Final Inspection + Document Review as per approved MTC / QAP
B - Final Inspection + Document Review as per approved MTC / QAP
C - Document Review as per approved MTC / QAP

TPI - Third Party Inspection Agency
QAP shall be prepared by vendor / laying contractor and shall be submitted for approval
All materials to be procured from MECON approved vendor in line with tender conditions.

APPENDIX - V

THIRD PARTY INSPECTION AGENCY

Contractor shall appoint anyone of the following TPIA for inspection purpose, wherever required as per tender document. Contractor has to propose minimum 4 nos. of below listed agencies to be approved by CLIENT / MECON:

a. Lloyd Register of Industrial Services
b. Technische Ulierwachungs Verein(TUV)
c. Det Norske Veritas (DNV)
d. AB-Vincotte
e. Bureau Veritas
f. SGS
g. American Bureau Services
h. Velosi Certification Services
i. Certification Engineers International Limited(CEIL)

Apart from inspection by TPIA, inspection may also be performed by MECON / CLIENT's personnel.

Annexure-VIII
to
Particular Job Specification
(PIPELINE INFORMATION MANAGEMENT SYSTEM)

PARTICULAR JOB SPECIFICATION (PJS)
PIPELINE INFORMATION MANAGEMENT SYSTEM (PIMS)

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2.0 WORK TENDERED

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Appendix-I : GENERAL TECHNICAL SPECIFICATION (GTS) FOR PIMS

Appendix-II : RESPONSIBILITY MATRIX

Appendix-III : PROJECT EXECUTION ORGANOGRAM

Appendix-IV : PIPELINE SCHEMATIC ROUTE DIAGRAM

1.0 INTRODUCTION

1.1 Indradhanush Gas Grid Limited (IGGL) is a joint venture of IOCL, ONGC, IGGL, OIL and NRL. IGGL was incorporated on the 10th of August 2018, towards implementing the Hydrocarbon Vision 2030 for North-East India released by the Ministry of Petroleum & Natural Gas (MoP&NG) in 2016. As per Hydrocarbon Vision 2030 for North East India, North East Gas Grid (NEGG), a natural gas pipeline network, is being set up to connect the eight North Eastern states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim as well as the regional gas sources of the Northeast to the National Gas Grid through Barauni- Guwahati Gas Pipeline. The project is being implemented in three phases based on the requirement of statutory clearance, route terrain, linkage with Highway corridor widening works, difficulty in work execution etc. for the development of a gas-based economy in North-Eastern India.

The Duliajan Feeder Line (DFL) is proposed for expansion of NEGG up to Duliajan for transporting Natural gas from Duliajan to Jorhat along with associated facilities. DFL shall connect gas sources of OIL at Duliajan and BCPL Lepetkata, with a provision to connect gas sources at HOEC Dirok & Antelopus Duarmara, OILMAX Amguri, OILMAX Tiphuk, ONGC Geleki/ Lakwa fields in the future.

M/s Indradhanush Gas Grid Limited (IGGL) has awarded MECON LIMITED the job of providing engineering & project management consultancy services of laying 24" NB x 180 Kms. (approx.) of Duliajan Feeder line for connecting Duliajan to NEGG Jorhat for transportation and distribution of Natural Gas in the region.

1.2 Present tender envisages laying of 24" NB x 174.236 Km (approx.) main pipeline from Duliajan to Jorhat. Pipeline will originate from OIL's CGGS Madhuban (Duliajan) at Ch. 0.00 Km to Receiving Terminal at existing SV-14 (Jorhat) of GNPL. The Lepetkata spurline will originate from DT at BCPL Lepetkata source to Receiving terminal cum injection point at SV-3 of Duliajan Feeder Line.

The schematic of the pipeline network is enclosed as drawing no. MEC/05/28/E/0085/M/1021 Rev-1.

1.3 This document covers details of work tendered, scope of work, scope of supply and other requirements pertaining to pipeline and associated facilities.

Details of associated Civil, Architecture, Structural, Mechanical, Piping, Instrumentation, Cathodic Protection, Telecom, Electrical, Corrosion Monitoring and Fire protection works etc. are covered elsewhere in the Bid document.

2.0 WORK TENDERED

Work tendered as a part of this Bid document consists of supply of materials as required, installation, testing, pre-commissioning of pipeline, preservation, drying and

commissioning. The work includes installation of pipeline and related piping works at despatch terminal, receiving terminal and all associated mechanical, civil, architectural, structural, cathodic protection, electrical, instrumentation, corrosion monitoring, PIMS ,telecom and fire fighting works at Stations along the route etc.

2.1 The details of proposed work are as under:

2.1.1 The brief scope of work, broadly consist of Laying, Testing and Commissioning of 24"NB x 174.236 Kms (approx.) and 24" NB x 6.027 Kms (approx.) pipeline in the Indian state of Assam including all associated works for transportation of Natural Gas/ R-LNG.

The pipeline facilities envisaged are described briefly herein below:

Duliajan Feeder Line (Duliajan to Jorhat Pipeline)	Pipeline from Despatch Terminal at OIL's CGGS Madhuban (Duliajan) to Receiving Terminal at SV-14 of GNPL (Jorhat) (24" NB x 174.236 Km approx.) in the state of Assam.
Stations/ Terminals	i. Despatch Terminals at Duliajan (Ch: 0.00 Km), Madhuban Tiniali, Tehsil: Duliajan, Distt: Dibrugarh (Assam)
	ii. Sectionalizing Valve Stations along the mainline (09 nos.) SV-01 at Ch: 16.0 Km (approx.)* SV-02 at Ch: 32.0 Km (approx.)* SV-03 cum Lapetkata Injection point at Ch: 48.0 Km (approx.)* SV-04 at Ch: 64 Km (approx.)* SV-05 at Ch: 80 Km (approx.)* SV-06 at Ch: 112 Km (approx.)* SV-07 at Ch: 128 Km (approx.)* SV-08 at Ch: 144 Km (approx.)* SV-09 at Ch: 160 Km (approx.)*
	iii. Future Tap-off point for BCPL Lakwa at Ch. 85 Km (approx.)
	iv. Intermediate Pigging Station IP-01 at Ch. 96 Km (approx.) *
	v. Receiving Terminal at SV-14 GNPL (Ch. 174.236 Km approx.), Vill: Kumar Gaon, Tehsil: Jorhat, Distt: Jorhat (Assam)

Note: *- The chainages of SVs and IP are tentative & for planning purpose only. The SV and IP locations have been decided without any consideration to existence of any all-weather road. The final location of SVs and IP shall be decided based on land availability near to existing all-weather road.

Duliajan Feeder Line (Duliajan to Jorhat Pipeline)	Pipeline from BCPL Lepetkata Source to Lepetkata (24" NB x 6.027 Km approx.) in the state of Assam.
Stations/ Terminals	i. Despatch Terminals at Lapetkata (0.00 Km), Village: Lepetkata Kachari Gaon, Tehsil: Lepetkata, Distt: Dibrugarh (Assam)
	ii. Receiving Terminal cum Injection Point at SV-3, Distt: Dibrugarh (Assam)

Contractor shall be required to deploy suitable teams and hardware for carrying out PIMS works for the said Pipeline Section.

The work includes providing solution and services for implementation of web based and GIS based Pipeline Information Management System for pipeline projects of CLIENT including setting up of office and support offices at Delhi/ NCR along with all requisite equipment/ tools/ consumables, trained manpower, GIS survey/ mapping, transferring/ conversion of data collected from owner for pre-construction, construction and post construction activities, as-built drawings of stations and mainline integration of different activities/ functions in electronic form including training of applications to owner's personnel, handing over software/ solution Application developed with requisite license and use for owner personnel's complete in all respect as per scope of work/ SCC and as per direction of Engineer-in-charge.

The scope of work also includes supply of GPS instruments and computer hardware with complete accessories and peripherals for PIMS application display as per tender including training to owner's personnel and final hand over to owner's personnel.

The Web & GIS based pipeline information management system shall be capable of archiving various data related to pre-construction, supply, inspection, delivery, construction, hydro testing, commissioning, as-built drawing for mainline & stations, ROU related data, material management data in electronic format which can be used in future for the development of maintenance and operation modules and to respond emergency situation during operation and maintenance.

2.2 Contractor shall deploy separate teams with all equipment/ hardware/ software for the Pipeline Section. Although, MECON/ CLIENT shall endeavor to facilitate PIMS contractor to get all the documents from the concerned parties, however, it shall be the sole responsibility of PIMS contractor to obtain all the documents from the concerned parties. The PIMS contractor has to interact/ liaison with the laying contractor of the pipeline, terminals as well as CLIENT & MECON to get the documents. The complete scope of work tendered is given elsewhere in the tender:

2.3 Owner intends to have a Web based and Licensed Arc GIS based management system which can archive various data related to pre-construction, supply, inspection, delivery, construction, hydro- testing, and commissioning, as built drawings for mainline and stations in electronic format which can be used in future for the development of maintenance and operation modules and to respond emergency situations during operation and maintenance stage.

2.4 The detailed route survey for the pipeline project has already been completed. The scope of work shall cover development of GIS based management system for above surveyed pipeline route. The contractor shall carry out development and customization of GIS

based management system for planning, execution, operation and maintenance controls, on a specified format using standard and approved quality control parameters.

2.5 The scope of work consists of the requirements mentioned in this document, enclosed standard specifications, Schedule of Rates and as mentioned elsewhere.

2.6 The design of the software & data formats will be done in consultation CLIENT/ MECON at Delhi office during the process of supply of software. Data input by successful bidder will start only after finalization of software design & data formats. The Complete package along with data & Licenses will be handed over to CLIENT after Integration of data into the system.

2.7 Successful bidder will hand over all data to CLIENT after integrating and giving an undertaking about authenticity of data certifying that all logged in data are as per requirement of the tender and are 100% true.

2.8 Owner has the right to crosscheck the authenticity of data being uploaded in PIMS & also check the integration & final presentation of the composite data to his satisfaction, as and when desired.

2.9 The development of GIS based management system shall be customized to suit owner's requirement on technical, organizational, training, operational, information management system area and integration with existing/proposed organizational systems for planning, control and information management, using suitable software.

2.10 Carryout interpretation and integration of all physical features. Symbolization/ legend structure, layering, edge matching, topological integrity, database linking, incorporation of processing techniques for attribute allocation etc.

2.11 The PIMS agency shall provide the details of the required hardware & software specifications including but not limited to server, storage, backup infrastructure, licenses, required bandwidth, monitor, scanner, printer and any other hardware etc. as required for storing the centralized data for effective functioning of the software application at owner's place at Noida/ Delhi. Above information shall be provided keeping in view future scalability of users, data etc. for a minimum of next 5 years.

2.12 PIMS application shall support virtualization platform (Vmware, Hyper V, Citrix etc.)

2.13 Bidder shall provide dedicated application support team, certified database administrator (DBA) during project implementation, warranty and support phase for any application related issues/ changes, configurations, database level troubleshoot and day-to-day operation like online data backup/ restoration, Database changes, database migration, database monitoring etc.

2.14 Role base access for the application and database shall be configured to avoid unauthorized access and which can be used for monitoring and analysis of logs.

2.15 PIMS application shall have multi browser support (ex. Internet Explorer, Google Chrome, Mozilla Firefox, Opera etc.). PIMS application shall be compatible with SAP system of CLIENT and it shall be able to integrate with SAP at a later date, if required.

2.16 Application shall support online as well as offline data entry. Wherever connectivity is available user can enter the data by logging in to the system. In case there is no connectivity, user must be able to enter data in offline mode and upload the same in the application at later stage when connectivity is available.

2.17 The documents which are uploaded in Pipeline Information Management System (PIMS) by the contractor will have a provision for linking with IPDMS of M/s IGGL for transfer of documents in future.

2.18 The Successful bidder should have proper auditable PIMS & IT security system in place. The bidder shall also provide PIMS system with appropriate IT security in order to protect it against data breach/ pilferage of data through hacking, etc.

3.0 SCOPE OF WORK

The Contractor's Scope of Work for the PIMS shall consist of, but not limited to providing services for implementation of Web & GIS based Pipeline Information Management System (PIMS). All such works that are not indicated here below but are otherwise required to complete the work in all respects shall also form part of Contractor's Scope of Work.

The scope indicated below shall be read in conjunction with Schedule of Rates as applicable, drawings, standards, specifications and other documents forming part of the Contract document.

All works listed below shall be applicable for Laying of Pipeline and their associated stations / terminals, unless specifically mentioned otherwise.

The detailed scope of work pertaining to Web & GIS based PIMS shall be in general but not limited to the following:

3.1 Overview

This document provides the minimum requirement for providing services for implementation of Web & GIS based Pipeline Information Management System (PIMS).

PIMS is a latest state of art system for electronic documentation and retrieval of Projects as built information. PIMS provides user-friendly and easy navigation web-based interface for quick retrieval of pipeline information at anytime from anywhere. This system shall include near real time uploading of progress and executed data of pipeline & associated works for construction and material supply.

PIMS solution shall be designed to satisfy the needs across different stages of project life cycle:

- Project Planning
- Project Execution/ Construction
- Operation & Maintenance

Broadly, the PIMS system shall provide facility for:

- Online generation of pipe-book & application for generation of alignment sheets,
- Complete traceability of material related to mainline works as well as stations / terminal works.
- Consolidate all information in a centralized database.
- Online reports (i.e. daily progress report, History sheets and other customized reports).

- Geographical Information System (GIS) compatibility.
- Online generation of executed all associated works and terminal works report.

Scope of Services shall also include developing the customized system, deploying required resources (personnel and machines) at execution site to directly capture & upload executed progress data from associated execution Contractor(s) and finally handover of complete system to CLIENT for further use in project during operation and maintenance phase.

3.2 Abbreviations & Definition

Company	:	IGGL
PMC	:	MECON
Contractor	:	Party appointed for providing services as detailed in the tender.
PIMS	:	Pipeline Information Management System
GIS	:	Geographic Information System
AFC	:	Approved for Construction
MT	:	Material Tracking
AGIs	:	Above Ground Installations
DPR	:	Daily Progress Report
AUT	:	Automatic Ultrasonic Testing
MUT	:	Manual Ultrasonic Testing
SV	:	Sectionalizing Valve
ITP	:	Inspection Test Plan
MPR	:	Material Progress Report
LR/ GR	:	Lorry Receipt / Goods Receipt
NDT	:	Non Destructive Tests
QC	:	Quality Control

3.3 System Requirements

3.3.1 The solution shall be a Web based system, which is accessible over the Internet to authorized users. The solution will enable access from geographically distant locations simultaneously.

3.3.2 Online generation of Pipe book at an end of day basis. The pipe book generated by the system will be hyperlinked to all the daily inspection reports / certificates and will provide snapshot view linking daily inspection reports like stringing report, welding report, bending report, AUT and MUT reports along with welder procedure specification,

3.3.3 Real time progress tracking of the construction in the form of web based, user defined progress reports in the following formats:

- Tabular reports
- Graphical reports
- Cumulative reports (to report day wise progress of each activity)
- Query based information retrieval

3.3.4 Web based reporting module to generate various reports for e.g.;

- Day wise Progress report on each activity
- Compliance reporting
- Exception reporting
- Error reporting
- Repair history of welds
- Welder's performance report

- Welding progress report giving a snapshot view of total number of welds, kind of weld, tie ins and open ends in graphical format, on user defined chainage.

3.3.5 Hyperlinked documentation- All the above-mentioned reports will be hyperlinked to the respective daily inspection reports.

3.3.6 Field data shall be collected and uploaded on PIMS database server at site on every evening by PIMS contractor so as to generate DPR (Daily Progress Report) by next day 11 AM. Further, days complete data to be uploaded on PIMS database server at site by next day.

3.3.7 Plot plan of all AGIs like SV/ Intermediate pigging/ terminal stations to be layered on GIS data with different equipments and facilities on the plot hyperlinked to provide complete traceability and hyperlinked / integrated to material tracking.

3.3.8 Error free information reports

- Stringent data validation at the time of data entry.
- Manual and electronic validation of data
- Conflicting reports reported to the owner online before being published

3.3.9 Geographic Information System (GIS) to be used to view Construction progress data, pipe book data, materials data, alignments sheets (AFC and as-built) data, and all related / hyperlinked certificates/ reports on GIS layer.

3.3.10 Search facility based on various criteria shall be available in software.

3.3.11 The software should be based on Pipeline Open Data Standards (PODS) for future seamless connectivity to any software like PAMS, IMS, SCADA, Primavera etc.

3.4 Monitoring Data Requirement

3.4.1 Line pipe & Long Radius Bend tracking

All activities as per approved ITP are required to be tracked and monitored through PIMS and their related evidence documents to be uploaded and hyperlinked suitably. Following are major activities to be covered as minimum:

- Pipe / bend basic dimensions (length, dia, thickness, bend radius).
- Raw material (Steel) procurement by supplier. Inspection and Testing details of plates with heat numbers.
- All testing activities as per approved ITP (i.e. NDT, Hydro-test, expansion, repair, visual inspection, physical & chemical tests etc.)
- Welding Procedure Qualification for Line pipe manufacturing.
- Line pipe coating Inspection & testing reports including batch details of chemical used.
- Calibration of all test equipments and machines in line-pipe manufacturing and Coating.
- Trailer vise line pipe loading & dispatch details (packing list, LR/ GR).

3.4.2 Material Tracking (MT)

All activities as per approved ITP are required to be tracked and monitored through PIMS and their related evidence documents to be uploaded and hyperlinked suitably for following, as minimum number of free issue / bought out materials :

- Coated Line Pipes

- Scrapper Trap with Pig Signaler
- Flow Tee
- Insulating Joint
- Quick Opening and end closure
- Fittings and Flanges
- Assorted Pipes
- Metering Skids
- Ball Valves
- Plug Valves
- SCADA Equipments
- Telecom Equipments
- Solar Power Equipments
- Equipments related to TCP & PCP

Owner's bought out materials for Pipeline Project by their respective vendors as well as bought out by Laying Contractors shall be monitored in MT system by taking inputs from MPR (Material Progress Report) issued time to time by respective vendors/ contractors.

The information touch points of MT will be defined from ITPs and range from Manufacturing location (vendor/ subcontractors/ subcontractors), Land/ Sea dispatch/ receiving points and finally the project site till the final installation and acceptance.

3.4.3 Pipeline Construction Work Tracking

- Route survey to pre-lowering stage
    - Route survey, clearing and grading (all daily progress and inspection reports relating to the same) & updating the cadastral survey data in GIS.
    - Trenching, stringing and bending
    - Welding
        i. Welding procedures
        ii. Welder qualification reports
        iii. Daily progress reports
        iv. All tests and inspection reports related to welding
            a. Radiographic procedure applied
            b. Radiographic inspection reports
            c. Fit-up test reports
            d. Weld visual
        v. Random QC test results (e.g. Peel Test)
        vi. Weld repair details and results thereof
    - Damaged pipe detail
    - Cut pipe detail
    - Joint coating
    - OFC related test reports
- Lowering and restoration stage
    - Padding inspection
    - Lowering reports
    - Tie-in
        i. Welding procedures

ii. Welder qualification reports
iii. Daily progress reports
iv. All tests and inspection reports related to welding

a. Radiographic procedure applied
b. Radiographic inspection reports
c. Subject to availability of Radiography films in a digitized/ scanned soft copy,

- Cut pipe detail
- Damaged pipe detail
- Fiber optic cable laying reports
- Backfilling reports
- Restoration reports & updating the cadastral survey data in GIS.
- Batch test certificates from manufacturers of electrodes
- Crossing reports
- All relevant hydro-testing and pre-commissioning data
- Cathodic protection system survey and test reports.
- All drawings related to the following will be stored in the system:
  - Route maps
  - Alignment sheets
  - Detailed AFC drawings (road, railway, minor water crossings, major water crossings, valley crossings)
  - Isometric drawings of installations
  - Special Installations e.g. hot taps. Optic Fibre Cable jointing
  - Terminal Works

Terminal layouts to be layered over Pipeline GIS system and different blocks/ areas in terminal shall be suitably linked to provide status on following:

- Site Survey & Grading
- Civil works (Foundation, Columns, and Slabs etc.)
- Mechanical works (Fabrication, fit-up, welding etc)
- Station Piping and related test and inspection reports
- Furnishing works (doors, flooring, ceiling, furniture, painting etc.)
- Electrical (Power supply systems)
- Instrumentation (Control System setup and erection related test reports)
- Power Source, SCADA & APPS, Telecom & PCP Works
- Equipment Foundations work progress and related equipments status hyperlinked to MT.
- Equipment installation, erection related test reports.
- Terminal material's traceability reports.

3.4.4 The software shall be capable to recall all the reports from various work packages and provide all statistics to the COMPANY which includes:

- Project S-Curve
- Progress
- Material Availability
- Resources Availability
- HSE Reports
- Quality data

- Equipment status (MCEDS reports etc.)
- ROU Availability
- Compensation payment to landowners/ farmers

3.5 PIMS MODULES

PIMS application shall include modules for documenting documents related to engineering, material procurement, construction, Land Management etc.

Modules shall be designed as follows:

LAND MANAGEMENT MODULE

- Land Record Master
- Route Map
- Cadastral Maps
- GPS Route Link
- GIS Mapping & Digitization
- RoU Details
- RoU Compensation Records
- Land Registry/ Lease

CONSTRUCTION MANAGEMENT MODULE

- Inspection (QA/ QC) Reports
- Activity Monitoring
- Real Time Pipebook
- DPR, WPR, MPR
- Station activity details
- Minutes of Meeting
- Exception & compliance reports

MATERIAL MANAGEMENT MODULE

- Purchase Order
- Order Tracking
- Material Inspection Report
- Inspection Release Note
- Goods Receipt Voucher
- Goods Issued Voucher
- Material Reconciliation
- Vendor Management

ELECTRONIC DOCUMENTATION MANAGEMENT SYSTEM (eDMS) MODULE

- Scanning & Archiving
- Document Indexing
- Search with keyword
- Reports, Manuals, Certificates, Drawings & other documents
- Document Tracking

Land Management Module:

This module shall capture the ROU as well as permanent land acquisition plot details of pipeline route. It shall cover other important details e.g. details of geography, demography, statutory and administrative boundaries of entire pipeline route. The application shall include land acquisition data for pipeline construction, survey data, crossing data including permissions, details of plot purchased/ leased for stations and anode beds. The module should have the following minimum details:

- ROU Details

The land owner details including permanent and alternative address. Mutation details, land usage details of the property owner including the crop details. The information on the compensation paid to the owner.
- Notification history.
-Crop Details
-Payment details.
-Alignment sheets, TP/IP's, Bench Marks/ GPS control points
-Population Density Index
-Alignment sheet
-ROU corridor details
-Crossing Details
-Land details for setting up of SV stations, dispatch, receiving and intermediate pigging stations.
-Environmental Sensitive Locations
-Emergency Details
-Administrative Boundaries
-MOEF clearance and TOR details
-EIA data

- Cadastral Maps

Cadastral maps of the route showing revenue data such as khasra no., etc.

- Permissions

Permissions, clearance and restoration acceptance from applicable statutory authorities such as forest department, railways, Irrigation, PWD, etc.

Construction Management Module:

It comprises of day wise construction progress including planning, quality and inspection reports activity details of which are as follows:

I. Route survey to pre-lowering stage
a) Route survey, clearing and grading (all daily progress and inspection reports relating to the same) & updating the cadastral survey data in GIS.

b) Trenching, stringing and bending
c) Batch test certificates from manufacturers of electrodes
d) Welding
- Welding procedures
- Welder qualification reports
- Daily progress reports
- All tests and inspection reports related to welding
    - Radiographic inspection reports
    - Fit-up test reports
    - Weld visual
    - Random QC test result.
    - Weld repair details and results there of Subject to availability of radiography films in a digitized/ scanned soft copy.

- Joint coating
- Concrete Weight Coating
- OFC related test reports

II. Lowering and restoration stage
a) Padding inspection

b) Lowering reports
c) Tie-in
- Welding procedures
- Welder qualification reports
- Daily progress reports
- All tests and inspection reports related to welding
- Radiographic procedure applied
- Radiographic inspection reports Subject to availability of Radiography films in a digitized/ scanned soft copy.
- Cut pipe detail
- Damaged pipe detail
- Fiber optic cable laying reports
- Backfilling reports
- Restoration reports & updating the cadastral survey data in GIS.

III. Crossing reports
a) HDD crossings
b) Railway Crossings
c) NH / SH Crossing
d) Other Road and foreign pipeline Crossings.

IV. Hydro-testing and pre-commissioning data
a) Water Filling, Pressurization & Hydrostatic test Reports
b) Dewatering Inspection Reports
c) Magnetic Cleaning Reports
d) EGP Reports
e) Swabbing Inspection Reports
f) Drying Inspection Reports
g) Inertization, preservations, inspection, commissioning reports

V. Cathodic protection system survey and test reports.
VI. Terminal Works

Terminal layouts to be layered over Pipeline GIS system and different blocks/areas in terminal shall be suitably linked to provide status on following.
- Site Survey & Grading
- Civil works (Foundation, Columns, and Slabs etc.)
- Mechanical works (Fabrication, fit-up, welding etc.)
- Station piping and related test and inspection reports
- Furnishing works (doors, flooring, ceiling, furniture, painting etc).
- Electrical (Power supply systems)
- Instrumentation (Control System setup and erection related test reports).
- Equipment Foundations work progress and related equipment status
- Equipment installation, erection related test reports.
- Terminal material's traceability reports.

VII. All drawings related to project shall be stored in the system.

VIII. Pre-Commissioning and Commissioning:
- All the data related to pre-commissioning and commissioning shall be captured
- Bidder to develop pre-commissioning and commissioning sub-module to control and monitor the pre-commissioning and commissioning activities through approved pre-commissioning and commissioning procedures.
- All related data shall be collected by Bidder from Contractor / Owner.

Project Certification System shall be a front end application & should be able to store track and report on the Completion of a facility, system or sub- system. The purpose of the system shall be to assist in the management of System Handover for Mechanical Completion, Pre-Commissioning and Commissioning. It shall enable progressive verification of physical installation work according to the design and specifications of equipment and systems, providing data traceability against relevant drawings ensuring compliance with performance standards, specifications, codes and regulations.

In addition, the system shall provide a collaborative real-time environment for fast and reliable tracking, monitoring and reporting on consolidated Punch list data stage completion.

The certificates and commissioning procedures to ensure project requirements are met for smooth transition process and turn-over of pre-defined systems and Equipment, stage completion certificates and Commissioning procedures to ensure project requirements are met for smooth transition process and turn-over of predefined systems and Equipment.

The system shall be able to generate the completion certificate online through web interface which can be used by Owner.

Material Management Module:

This module is dedicated for tracking of procurement and supply of all materials for the project. It shall include various stages from procurement order, manufacturing, coating- painting, testing, inspection, dispatch and storage at site of all items used in the project as per OWNER's approved ITP. Major focus of this module shall be to access delivery progress of all critical items such as line pipes, valves, etc. including its consumption and stock availability at store yards. This tracking shall have sequential hyper-linking for upload of documents by vendors and contractors. The material tracking system shall manage the material status from PO release to item used. Each material shall be listed with a unique item Code. Planning and scheduling shall be as per the Quantity required, scheduled PO release, scheduled Delivery date range. The system shall also have a PO tracking system along with vendor management. Quantity receipt consolidation should be supported by approved documentation like material receipts and Inspection reports. Appropriate material test certificates are also uploaded along each delivery.

Recommended Features:

- Tender
- Purchase Order
- Reorder alert report
- Manufacturing status
- Delivery due date list
- Quantity delivered v/s ordered
- Reconciliation statement

Line pipe & Long Radius Bend tracking

All activities as per approved ITP are required to be tracked and monitored through PIMS and their related evidence documents to be uploaded and hyperlinked suitably.

Following are major activities to be covered as minimum:

- Pipe / bend basic dimensions (length, diameter, thickness, bend radius).
- Raw material (Steel) procurement by supplier. Inspection and Testing details of plates with heat numbers.
- All testing activities as per approved ITP (i.e. NDT, Hydro-test, expansion, repair, visual inspection, physical & chemical tests etc.)

- Welding Procedure Qualification for Line pipe manufacturing.
- Line pipe coating Inspection & testing reports including batch details of chemical used. Trailer wise line pipe loading & dispatch details (packing list, LR / GR).

Relative evidence documents for all items to be uploaded and hyperlinked suitably for following, as minimum number of materials;

- Steel Plate/ Coil
- Line Pipes
- Actuators
- Ball Valves
- Other Valves such as Globe, Plug, check, etc.
- Scrapper Trap with Pig Signaler
- Flow Tee
- Insulating Joint
- Quick Opening and end closure
- Reducers
- Flanges
- Station Pipes
- Metering System
- SCADA Equipment
- Telecom Equipment
- Solar Power Equipment
- Equipment related to TCP & PCP.
- DG Set
- UPS
- Electrical & Instrumentation systems
- Any other item as required

Materials for above packages and items procured by respective vendors and materials procured by Contractors shall be monitored by taking inputs data from MPR (Material Progress Report) of respective vendors/ Contractors.

eDMS Module:

This eDMS Module refers database for all discipline wise project data of each package for pre-construction, construction, post- construction related activities and any other required information but not limited to, as following:

- Letter of authorization
- Tender document
- Design basis
- Pipe information (Manufacturing history, inspection documents, test certificates of pipes/ plates).
- Pipe reconciliation statement
- Material acceptance (Joint coating material manufacturers test certificates).
- Manufacturers test certificates and site qualification test reports like filler material, electrode etc.
- Procedure reports.
- Approved procedures, job procedures, welding procedures specification and qualification
- Scanning and digitization of gazette notifications
- Design Calculations/ Analysis
- Route maps
- Alignment sheets
- Detailed AFC drawings (road, railway, minor water crossings, major water crossings, etc.)

- Plot plan
- General Arrangement Drawings (GAD)
- Isometric drawings of installations
- Special Installations e.g. hot taps etc.
- Hydro testing and pre-commissioning documents/ data including water filling, pressurization and hydro test reports, dewatering inspection reports, magnetic cleaning reports, EGP reports drying inspection reports, inertisation, preservation inspection/commissioning reports.
- HAZOP report
- Emergency Response Plan
- QAP
- As-built drawings and documents
- Vendor / Contractor bills / invoice along with payment history.

Engineering and document and drawing approval status is tracked using this module.

a) PIMS configures the Document/ Drawing list from the Document control log & Material Control Log.
- Document/Drawing Code
- Category
- Sub Category
- Document Name
- Proposed date of Creation
- Estimated date range of Internal Document Control.
- Date range for Submitting to Client for comments
- Date range for incorporating comments
- Date range for Issuing for approval
- Date of Approval (AFC).

b) When a document/drawing is approved, it is scanned and attached.
c) Exhaustive search and summary reports are generated.
d) The document/drawing is uploaded as soon as its status is “approved”.

The eDMS module is searchable using metadata like category, sub category, type of document, vendor, material, remarks and document number, etc.

3.6 Pre-Commissioning and Commissioning Module

All the data related to pre-commissioning and commissioning shall be captured on PIMS. Data related to PESO/ OISD/ Internal audits shall also be recorded.

Contractor to develop pre-commissioning and commissioning module to control and monitor the pre-commissioning and commissioning activities through approved pre-commissioning and commissioning procedures.

3.7 Data Capture Interfaces

Monitoring data capture and then its uploading on PIMS shall be the responsibility of contractor & PMC. All monitoring data shall be collected on daily basis from respective vendors/ contractors. Interface document for this shall be prepared and agreed with Contractor after award of PIMS work.

3.8 System Handover

It is responsibility of contractor to ensure complete backup, safety and confidentially of the data. After commissioning of Project, PIMS contractor shall handover the complete information

management system database with all licensed software (for lifetime) to Company. Handover shall consist of installation and running of PIMS on Company's serve to the satisfaction of the Company.

4.0 SCOPE OF SUPPLY

4.1 Items to be Supplied By COMPANY as Free Issue

Company shall supply all inputs like construction / supply drawings, documents, data, etc. required for implementation of Web & GIS based Pipeline Information Management System to the Contractor at an appropriate time during the execution stage as free issue items on refundable basis.

4.1.1 Conditions for COMPANY Supplied Items

i. The Contractor shall be responsible for taking over of the material and subsequent handling during performance of actual work at site & safe keeping of the inputs drawings, documents, data, etc.

ii. The Contractor shall inspect all COMPANY supplied free issue items at the time of taking over from the COMPANY and defects noticed, if any, shall be brought to the notice of COMPANY / COMPANY representative and jointly recorded. Once the item has been taken over by the Contractor, all the responsibility for safe keeping of the items shall rest with the Contractor.

iii. Every month the Contractor shall submit to the COMPANY an account for the item issued to the Contractor in the Performa prescribed by Engineer-in-Charge.

iv. On completion of the works Contractor shall submit "Item Appropriation Statement" for all items supplied by the COMPANY as free issue items.

4.2 Item to be supplied by CONTRACTOR

The procurement and supply, in sequence and at appropriate time and place, including inspection and expediting, of all Items and consumables required for completion of the WORK as defined in this BID document except the Items specifically listed under para 4.1 above as COMPANY free issue Item, shall be entirely the CONTRACTOR's responsibility and the item rates quoted for the execution of the WORK shall be inclusive of supply of all these Items. All Items supplied by the CONTRACTOR shall be strictly in accordance with the requirements of relevant COMPANY specifications enclosed with the Contract document. All equipment, machines, instruments, components etc. shall be new and specifically purchased for this job from Company approved vendors, duly inspected by approved third party inspection agency (Only manufacturer certificate may not be adequate).

4.3 Storage of Items / Materials

4.3.1 All items / materials shall be preserved against deterioration due to poor or improper storage while under the custody of the Contractor.

4.3.2 All items / materials shall be duly protected by the CONTRACTOR at his own cost.

4.3.3 Openings of equipment, machines, instruments, etc. shall be kept in covered condition to prevent entry of foreign matter.

5.0 MANPOWER AND EQUIPMENT TO BE DEPLOYED BY CONTRACTOR

Sl. No	Manpower	Number Per Camp	Qualification	Location	Equipment
1	Site Engineer	2	Mechanical Engineer	Camp Office	1 No. Laptop along with high speed internet connectivity (minimum 1 Mbps), A3 Scanner, 1 A4 Printer
2	Surveyor	1	Surveyor	Camp Office	GPS Device
3	Co-ordinator	1	Mechanical/ Civil Engineer	Back Office/ Camp	
4	QA Engineer	1	Mechanical Engineer	Back Office	
5	GIS Analyst	1	BCA/ MCA or equivalent in GIS	Back Office	
6	Developer	1	BCA/ MCA/ B.Tech (Computer Science/ IT)	Back Office	

6.0 SITE VISIT

Bidders are advised to make site visits to familiarize themselves with all the salient features of site and available infrastructure along the pipeline route / site. Contractor shall be deemed to have considered all constraints and eventualities on account of site conditions along pipeline route while formulating his bid. Contractor shall not be eligible for any compensation in terms of cost and/ or time, on account of site conditions along pipeline route varying to any extent from whatever described in the Bid Package and the drawings furnished along with the Package.

7.0 PRIORITIES

COMPANY may, at its sole option, assign priority of work to any part of the total pipeline or terminal works. Contractor shall comply with such priority of execution without any time and cost implication to the COMPANY.

8.0 CONFLICT / DISPUTE

In case of any dispute / conflict arises within Particular Job Specification (PJS) and their

associated documents (like Appendix & Annexures), the most stringent requirement will govern. However, engineer-in-charge's discretion shall also govern on the above issues based on the applicability as per site conditions.

APPENDIX–I TO PJS

GENERAL TECHNICAL SPECIFICATION (GTS) FOR PIPELINE INFORMATION MANAGEMENT SYSTEM

1.0 INTRODUCTION

The Pipeline Information management system is a web based solution, designed to monitor the construction progress on a real time basis. Data that is entered on daily basis is indexed and linked with scanned documents that provide validated data. Reports are generated in a telescopic format that helps to browse from the route map to details of each pipe laid. The solution is designed to provide real time information about pipeline laying progress alongwith all associated works including stations/ terminal works during following three stages, project planning, project execution/ construction, pre-commissioning & commissioning, operation and maintenance. Electronic documentation, graphical reports, pipe book, joint history etc. are some of modules of PIMS.

The pipeline information management system is a web based solution, designed to

a) Act as a Monitoring system
b) Help decision making in construction planning
c) Show real time progress on web
d) Generate online report
e) Consolidate all information in a centralized database
f) Archive documents online
g) Help in project execution / construction, pre-commissioning & commissioning.
h) Assist operation & Maintenance

This document would be the reference document for any details related to the project scope and implementation procedure.

2.0 PIMS SCOPE OF WORK

2.1 The bidder is required to make use of software solution to track construction progress of the project on a real time basis updated daily. The progress needs to be displayed electronically on a web based format. Proper secured access is to be provided to the consultant and client enabling review of construction progress on a daily basis.

2.2 Along with the technical submission, the consultant/ client may call upon the bidder to demonstrate the software proposed to be used.

2.3 All pipeline construction related documentation (QA/ QC reports, procedures, project planning documents, test certificates, records of meetings, land records, photographs, inspection material reports and audit compliance documentation) including the pipe book, weld book are required to be handed over to the client in an electronic form in appropriate formats and system.

2.4 Apart from storing all paper documentation, the software should have requisite feature/ facility to generate as-built alignment sheets from varying points of the pipeline ROW. It shall be the contractor's responsibility to collect GPS co-ordinates at each weld joint using hand-held portable GPS co-ordinates.

2.5 The software should also have the feature/ facility that the daily progress can be shown (apart from tabular reports) on a web, with progress of different activities, geo referenced to the surroundings land base.

2.6 All NDT test reports are required to be handed over to the client in an electronic format, duly geo referenced as part of the software archival features.

2.7 The proposed software solution should have search/ query features. The fields may be sorted/ searched by chainages, joint number, etc. It should also have the feature to print the query.

2.8 The software shall have the facility to auto-generate pipe book.

2.9 The software shall have the option of reconciliation of free issue materials, electronic documentation and material management.

2.10 The contractor will impart training to the client, consultant and laying contractor on usage of the PIMS solution and its application

2.11 All survey data, engineering documents, construction reports, ROU details, user manuals shall be uploaded to respective modules (as applicable) of GIS Software developed by CLIENT.

2.12 The Contractor / PIMS service provider shall be solely responsible for arranging all resources, facilities and logistic supports etc. required to complete the work under this contract. In broad, the contractor shall be responsible for providing the following:

i) Establishment of offices with proper storage and security arrangement for all spreads at suitable locations in the nearby area of owner's camp office to carry out his activities in close coordination and in an efficient manner.

ii) Deployment of requisite manpower for project implementation, providing all qualified skilled/unskilled personnel to carry out the entire job and facilities required to complete the job to the entire satisfaction of the owner in accordance with the requirements of the tender document.

iii) Deployment of all requisite hardware (servers, computers, printers, scanners, UPS, etc.) loaded with requisite software application to run MS-Office GIS model, other software and applications required for the project implementation

iv) Insurance of all his hardware/ software and other equipment and personnel deployed for the execution of the above work.

v) All consumables for scanning, printing, storing, and creation of backup data

vi) CD's/DVDs and alternate consumables of backing up of data

vii) Organizing the onsite team's travel to site for GIS survey

viii) Boarding and lodging for all its personnel deployed for the execution of the above work

ix) Local transport / conveyance for commuting to onsite location from the place of boarding and commuting on the ROW for the GIS survey

x) Establishment of suitable communication network with a provision of Internet connection for communication, email and uploading and downloading of scanned documents

xi) Meeting all requirements of documentation.

xii) Certification of the quality and accuracy of work carried out.

xiii) Right of access for audit of the quality and accuracy of work done.

xiv) Contractual requirement for quality of code.

xv) Arrangements should be made to ensure that all parties involved in the contract are aware of their security responsibilities.

xvi) The integrity and confidentiality of the Owner's information assets are to be maintained and tested.

xvii) Adequate physical and logical controls should be used to restrict and limit the access to the Owner's business information to the authorized users.

xviii) The level of physical security to be provided for equipment.

xix) Owner should have the right to audit/ third party audit the information security management system of contractor.

xx) Contractor shall be responsible for settling all compensation and disputes arising out of any damages caused by him or his workmen during the execution of work. Contractor shall carry out all work in strict compliance with applicable documents enclosed with the tender document and as per the instructions of owner's representative. The scope of work shall also include any other item/work required to complete the work in all respects as per specifications, drawings and instructions of owner's representative whether specifically mentioned here in or not, but required to fulfill the intended purpose of this tender document.

2.13 The software solution chosen by the contractor should have been used and tested on previous pipeline projects.

3.0 FEATURES OF PIMS SYSTEM

The proposed PIMS software should have the following features as a minimum:

3.1 Technical features

a) Security of data base and world class data recovery management
b) Simultaneous monitoring from different locations/ spreads by contractor, CLIENT / MECON.
c) Protection from virus attack and other malignant programs
d) Scale dependent feature drawings and application execution
e) Feature labeling including label collision mediation
f) Fully customizable template driven output
g) True type fonts
h) Map element automation (scale bar , reference map and legend)
i) Thematic mapping using logical or regular expression based classes
j) Support for popular scripting and development environments (PHP, Python, Perl, Ruby, Java and C# etc.)
k) Cross Platform support
l) Compatible with Linux, Windows, Mac OS, Solaris etc.
m) Remote daily back-up using r-sync or equivalent technology
n) SSH encryption
o) On the fly compression
p) FTP access
q) No data transfer limit
r) Indexing and archive documents online in a searchable format

3.2 General features

a) Monitoring of pipeline construction activity
b) Linking of surrounding landmarks and data in corridor manager
c) Data updating on a daily basis
d) Generation of alignment sheet using survey data
e) Online alignment sheet generation
f) Auto-generation of pipe book
g) Real time pipeline laying progress monitoring
h) Monitor online records of progress
i) Monitoring of material availability and quality documents
j) Uniformity of documentation and reports
k) Real time creation of pipe book , weld book
l) Real time creation of welder performance reports, pipe reconciliation reports.
m) Pre hydro test and pre lowering compliance report generation

3.3 Planning and material management

a) Material management from starting from order placement, manufacturing & inspection at vendor works, receipt at site, issue to vendor, erection/ commissioning, reconciliation (including test

certificates, inspection certificates, goods receipt voucher (GRV), store issue voucher (SIV), incoming material inspection report (IMIR), inspection release/ waiver certificate etc.)

b) Document control log
c) Material control log
d) S-Curve to assess the current project status w.r.t planned schedule for each activity as well as overall (weighted based)
e) Velocity chart : work done for a particular activity in chainage vs week
f) Graphical progress: to give an overview of work done in each chainage
g) Reconciliation of each type of free issue material issued to the pipeline contractor (Refer Annexure-8 for guidelines on reconciliation)

3.4 Real time web progress monitoring

a) Dynamic generation of DPR with planned time line and asking rate.
b) Real time generation of pipe book with hyperlinked scanned ITR (Inspection test reports)
c) Tie in Chart with complete history (WPS no. , welder details, pipe details, NDT details etc.) of each activity for each joint.
d) View/ export pipe book in real time, Daily DPR, Activity data sheets, Joint schematic, Station piping etc.
e) Reports of minimum following activities shall be digitized for monitoring for real time progress monitoring:

- Clearing & Grading
- Stringing
- Bending
- Trenching
- Welding
- Tie in Welding
- Welding Repair
- Non Destructive Testing – Radiography / AUT
- Non Destructive Testing – Ultrasonic Testing
- Non Destructive – Magnetic Particle testing
- Non Destructive- Liquid Penetration testing
- Joint coating
- Lowering
- Back Filling
- Restoration
- Hydro Testing
- TCP / PCP
- Crossings
  - HDD
  - Cased Crossing
  - Thrust Boring
  - Open Cut
- Concrete Coating

- Coating Repair
- Cathodic protection system reports
- Station piping fit-up
- Station piping welding
- Station piping NDT
- Station piping Painting
- Civil works (building, road, boundary wall etc.)
- Instrumentation works
- Electrical Works
- Fire-fighting works
- Structural works
- Corrosion Monitoring System Works
- Telecom works
- SCADA works

3.5 Generation of compliance reports

a) Query for exceptions like joint coating done but NDT not done, lowering done but joint coating not done etc.
b) Welder performance report
c) Unqualified welder report
d) Duplicate pipe control

3.6 Indexing and archive documents online in a searchable format

a) Exhaustive document/ drawing scanning & indexing with searchable metadata. All pre-construction, construction, as built and hand over documents must have search/ query options. There should also be provision to print the queried data.

3.7 ROU Data digitization

a) Collection of revenue data such as village maps, Ownership records from concerned Revenue Department/ client for acquired RoU
b) Scanning, geo-referencing and Digitization of the village map, and transferring the pipeline alignment and RoU corridor.
c) Preparation of seamless cadastral map (RoU Land map) to the scale of 1:5,000 incorporating survey number and ownership details with in the acquired RoU. The land details (ownership details, compensation details etc.) shall also be presentable in graphical mode
d) Conversion of RoU land maps and digitized cadastral records to .shp file.
e) Conversion of already existing cadastral maps/ data to .shp files
f) Collection of available data from CLIENT (soft/ hard copy) pertaining to revenue map, ownership details of RoU, compensation details etc. and digitizing the same for graphical representation of data.

3.8 Graphical Representation of survey information

a) Land records
b) Crossing and utilities
c) Location of crossings, SV / IP
d) Photographs of crossings/ mainline activities
e) Crossing drawings
f) Representation of surroundings features
g) Structure and monuments in vicinity
h) Tracking work progress using color codes
i) Generation of web based PIMS alignment sheet using third party application integrated with Arc GIS.

4.0 Project Roles & Responsibilities

4.1 Tentative Responsibility Matrix

Sr. No.	Information / Document Required	Client/ PMC / Supplier/ Execution Contractor
1.	Pre-Construction and Project Configuration Information	Planning
2.	All Standards & Approved procedure documents.	QA / QC
3.	Approved engineering documents	QA / QC
4.	Approved construction related documents	QA / QC
5.	Engineering / Document status control information	Engineering
6.	Approval of structure/fields of pipe book and other forms that are to be filled at site for progress as well record of work	Planning
7.	Submitting daily activity ITR's /Progress. Details/GPS coordinates	Construction
8.	Activity Completion Certificates	Construction
9.	Reporting of changes like, route, TP angles, new crossings, scope of work, work schedule etc	Construction
10.	Inspection / Quality certificates Material, WQT, WPS	QA / QC
11.	Ensuring correction of NCR generated by PIMS .	QA/ QC
12.	Procurement status and receipt information/documents	Materials
13.	Pipe Details / List from manufacturer, Yard Receipts.	Pipe Manufacturer / Materials

5.0 Work Procedure

5.1 Execution Methodology

a) PIMS site engineers shall enter the data from their own camp offices located at site.

b) PIMS site engineer shall collect approved field inspection reports from contractor office daily in the evening.

c) These reports shall then be entered in the PIMS (PIMS site engineer shall exercise due diligence to the accuracy of the reports and discrepancy, if any, shall be reported directly to MECON).

d) Reports shall automatically be generated in real-time.

e) Quality Engineer at head office shall verify all reports/ document data by 11.00AM next day.

f) Current information. Next day plan, daily progress report, document status, documents, procurement status for uploading (preferably in .xls format) shall be provided to PIMS engineer on a daily basis.

g) Digital Photographs/ videos duly labeled (with chainage/ location) for crossings, stations, special utilities/ surroundings etc. should be linked to pipe route schematic. These photographs must be updated as and when progress is done.

h) Deviation reports for route changes, process changes, etc. along with their documents shall be provided.

i) Comprehensive training shall be imparted by the PIMS Contractor to the Client's personnel on usage of PIMS software.

5.2 Configuration & Pre-Construction

a) The following are the details, information, drawings and documents required for configuring the PIMS. Only approved for construction information will be digitized.

i. Project details as per project tender specifications.
ii. Tender Docs to be uploaded in documentation.
iii. Company profiles of Contractor, PMC and Client.
iv. Route Map and Line Diagram.

b) Survey data is required for generating PIMS alignment sheet and route Corridor Manager. Corridor is generated based on chainages. Survey data has to be digitized on PIMS approved format and then imported in the solution. The survey data to be included is as follows :

i. TP and IP numbers, angles and locations.
ii. Crossings, CS numbers, Crossings type, Crossing width and locations.
iii. Topographic details of ROW.
iv. Ground Level profile
v. Soil resistivity survey details

vi. Soil stratification details
vii. Population Density (PDI)
viii. Cadastral records with survey numbers, village, taluka, district, state and maps, referenced with chainage.
ix. Planned Pipe specifications

c) Alignment Sheets: Pipeline alignment sheets in CAD format.

d) Project Schedule: Generating project schedule and Gant chart using PIMS tools.

e) Activity Settings: Configuring activity scope and weightages for S-curve generation.

f) Document & Material Control Log: For Indexing the engineering approval status.

g) Procurement Status: Material list with schedules and scope.

h) Customization of following Reports as minimum :

i. Formats of various reports to be customized like;
ii. Pipe Book
iii. DPR
iv. Setting up WPS types
v. Importing pipe list
vi. Configuring Welder cards
vii. Customizing input forms of various activities.

5.3 Welding Procedure Specification (WPS) :

The following minimum details are to be configured:

i. WPS Number
ii. Diameter of Pipe (From- To)
iii. Wall thickness (From- To),
iv. Material
v. Welder ID's qualified for each WPS
vi. Procedure qualification report (PQR).
vii. Voltage & current parameter range.

5.4 Defect Types

A list of different type of defects (Weld Defects) will be configured as per CLIENT Quality records.

5.5 Bend Type

A list of different type of bends shall be provided, complete with details of relevant chainage.

5.6 Welder Details

The following details shall be configured as a minimum:

a. Welder ID
b. Qualification Certificates.
c. For evaluating the welder performance, the NDT analysis should reflect or trace the weld defect to a specific welder.
d. In weld repair, the defect welder should be mentioned.

5.7 Field Inspection Report Numbering

Field Inspection report numbering procedure is to be defined. A unique number is to be provided to each inspection report of each activity that is to be managed through the construction management module.
In case project is divided into multiple Spreads, Spread number must be mentioned on each activity report separately. For example: If there are four spreads in a project, reports can have SP-1 for 1st Spread and SP-2 for 2nd Spread.
For any single activity, report number should not repeat within spread. Report number can be same for two spreads. Eg. For spread number SP-1, Trenching should not have two reports of Number 01. But Spread 2 (SP-2) can have report number 01.

5.8 Pipe Number Specifications

It is advisable that PIMS imports the pipe-list provided in .xls format by the manufacturer. Apart from the pipe number, the PIMS system must list the pipe specification, manufacturer, coating company, dispatch date, manufacturer test certificate.

If any pipe 'X' has Pipe No = "2V07K30779" then no other pipe can have same. PIMS differentiates the pipes not just by the pipe number, but also compares the heat number and coating number.
PIMS engineers should not enter the pipe number manually throughout the activity of digitization process (Stringing, Bending, Welding, NDT, Joint Coating etc). They should only select the pipe number from the drop down pipe list.

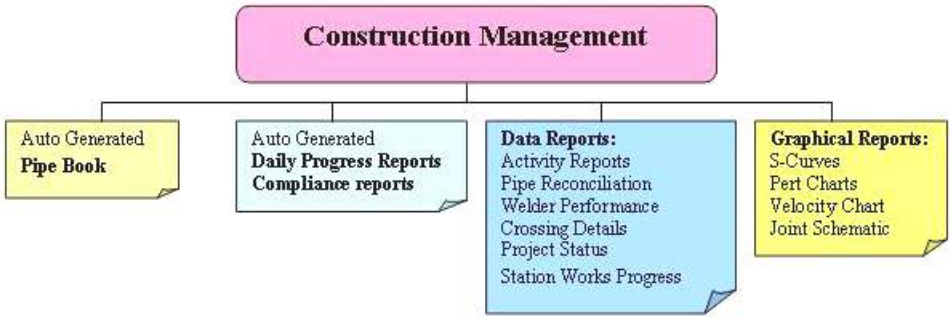
Naming convention for Cut/Pup Pipes

If pipe “2V07K30779” is cut into two pup pieces, then both the pieces shall be numbered by suffix. The terminology will be as per CLIENT’s quality records.

The pipe list report should have a special reconciliation section where pup pipe list should be elaborated along with their actual length. If a pup pipe's length is less than 2 meter (or as specified in the specification for reconciliation of free issue material attached elsewhere in the tender), it will be listed as scrap.

6.0 PIMS Modules

Modules followed for the project shall cover all the aspects of the tender. Indicative diagram / layout has been shown below:



PIMS MODULES

Construction Management
Activity Monitoring
Real Time Pipebook
Daily Progress Report
Crossings
Station Reports
Exceptions & QA reporting
Compliance Reports

Electronic Documentation
Pre-Construction Documents
Survey Documents
Construction Documents
Approved Drawings
Approved Engineering Procedures/ Documents
ROU data
Georeferencing of land data along the pipeline

Material Management
Material Receipt
Material Issued to Contractor
Material reconciliation
Material Documents (TC, IRN etc.)
User Manuals/ Approved Vendor docume

GPS Referencing
Alignment Sheet Generation
Corridor Management
GPS route Link
GIS Mapping & digitization
Graphical Land Record Master

7.0 REPORTS

Following minimum reports can be uploaded for users to view and download. These are to be sorted date wise.

a) Daily Progress Report
b) Weekly Progress Report
c) Monthly Progress Report
d) Station works progress
e) Approved & Updated Project Schedule

f) 3 Months Look Ahead Schedule
g) 6 Weeks Look Ahead Schedule

7.1 Quality Methodology

a) Error Reports for all activities are generated online and will be sent to CLIENT.
b) PIMS generated exceptions for example;
Duplicate Pipe & Joints
Incorrect Pipe number in report
Unqualified welder report
All data entry is verified by PIMS QA Engineer.
c) Visual Inspection of ITR's at site by PIMS engineers for any legibility/ incorrect format / incomplete entries / ambiguous data etc.
d) Exception reports are submitted to CLIENT along with the feedback form as below.

Sr. No.	Date of reporting	Activity	Report No	Non conformity	Date submitted to CLIENT	Date Rectified

7.2 PIMS construction activity digitization

All pipeline construction activity reports are digitized, scanned and uploaded. The fields needed for digitization may not be limited to the following;

a) ROW/ Clearing & Grading/Trenching/Stringing

Sl. No	Date	Chainage in Meters (From)	Chainage in Meters (To)	Distance in Meters	Remarks

b) Bending

Sl. No	Date	Chainage in Meters	Pipe No.	TP No.	Bend angle	Bend Type	Remarks

c) Welding

Sl.No.	Date	Joint No.	Pipe no. (Left)	Pipe No. (Right)	WPS No.	Welder (Root/ Hotpass)	Welder (Filler/ Capping)	Electrode Batch no	Remarks

d) Tie-In Welding

Sl. No	Date	Joint No	Pipe no. (Left)	Pipe No. (Right)	Cut Pipe Details	WPS No.	Welder (Root/ Hotpass)	Welder (Filler Capping)	Electrode Batch no	Remarks

e) Welding Repair

Sl. No	Date	Joint No (R, R2, Cut-out)	Segment	WPS No.	Welder No.	Electrode Batch No	Remarks

f) Non Destructive Testing - Radiography/AUT

Sl. No	Date	Joint No	Segment	Observation	Root Defects	Hot pass defects	Filler defects	Capping defects

g) Non Destructive Testing - Ultrasonic Testing

Sl. No	Date	Joint No	Segment	Observation	Remarks

h) Joint Coating

Sl. No	Date	Joint No	Holiday Test	Average Pipe Coating Thk (on body)	Average Weld Coating Thk (on seam)	Surface Preparation	Pre-Heat Temp	Peel Test	Remarks

i) Lowering

Sl. No	Date	Joint (From	Joint (To)	Section Length	Holiday Check	Pipe Cover	Northing (GPS)	Easting (GPS)

j) Back-filling

Sl. No	Date	Joint (From)	Joint (To)	Section Length	Remarks

k) Restoration

Sl. No.	Date	Joint (From	Joint (To)	Section Length	Work Done	Remarks

l) Hydro-testing

Sl. No	**Date**	**Joint (From)**	**Joint (To)**	**Attach Documents**	**Remarks**
				Hydrotest Plan, Safety Plan, Mechanical Completion Certificate, Air Cleaning Report, Brushing Report, Gauge Inspection Report, Water Filling Report, Thermal Stabilization Report, Pressurization -50%, 75%, 100% Air Volume Calculation, Pressure hold 24 Hrs, Hydrostatic Test Calculation, Hydrostatic Test Evaluation, De-Pressurization	

m) TCP/PCP

i) TLP Installation

Sl. No.	Date	Report No.	Type of TLP	Joint No.	Chainage in Mtr.	Remarks

ii) TCP Anode Installation

Sl. No.	Date	Report No.	Chainage	Remarks

iii) Anode Bed Installation

Sl. No.	Date	Report No.	Location	Remarks

n) Concrete Coating

Sl. No.	Date	Report No.	Chainage (from)	Chainage (to)	Remarks

o) Coating Repair

Sl. No.	Date	Report No.	Joint No.	Remarks

8.0 WORK PROCEDURE – WELD MAP UPDATING

The weld map updating procedure in PIMS shall consist of digitization the following reports:

a) WPS numbers and respective details and document.
b) Welder numbers and respective WQT or welder card.
c) Welding field inspection reports.
d) NDT inspection reports.
e) Weld repair reports.

8.1 Weld Joint Nomenclature

a) The welding joint nomenclature shall be as per approved weld joint numbering procedure is as below:

b) Weld joints on the pipeline shall be numbered consecutively for each kilometer, starting at 0 Chainage.

c) Each Joint shall be Prefix'ed or Suffix'ed with the Letters in Capital as per the approved methodology with EIC. The indicative description shall be as follows:

Prefix	Denotes	Description	Examples
M	Mainline	Joint is of Mainline	5 M 40
S	Stations	Joint is with in a ball valve station	S 2-21

T	Tie in		5 T 43
FT	Final tie in	Joints between free section ends	9 FT 82
GT	Golden Joint	Golden Joint on hydro test section ends	15 GT 83
TR	Transition Welds	Joints with different wall thickness	12 TR 12
R1	Repair	First Weld repair	14 H 56 R1
R2	Second Repair	Second Weld Repair	14 H 56 R2
RW	Reweld	Joint is cutout but retains original number	56 H 47 RW
CO	Cut Out	Cut Out Joint detail	14 H 56 CO
A, B ,C	Additional joints	Due to creation of void between sections having successive joint numbers	… 17 H 24 , 17 H 25, 17 H 25A , 17 H 25B , 17 H 25 C , 17 H 25 D , 17 H 26…..

d) The weld number, e.g. 5 M 4L where 5 indicates the 6th kilometers (i.e. between KP 5 and KP 6) and 41 indicates weld number 41.

e) Tie-in welds shall be given the prefix "T" and use the same numbering as the mainline (as above).

f) FT will indicate joints tied between two sections involving cutting of pipe and stress developed during fitting of two ends.

g) GT will indicate Golden tie-in's performed between hydro-test sections.

h) TR will indicate weld joints performed between pipes with different thickness.

i) If a weld has been repaired it shall retain the original number but followed by the letter RI (e.g. 5 M 41 RI). If it is repaired a second time the weld number shall be followed by "R2" (e.g. 5 M 41 R2).

j) If a weld has been cut out and replaced by a pup pipe, creating Iwo welds, then the original weld will be posted in cut-out log having the original number followed by the letters "CO" (e.g. 5 H 4) CO). This joint will not be considered in the pipe book but will be shown in cutout joint log: The new length of the pipe will be updates for reconciliation. Pipe numbers will be suffixed with A, B, C and so on.

k) If a good or accepted weld has been cut out and replaced by a new weld, then that weld shall retain the original number followed by the letter "RW" (e.g. 5 M 41RW).

l) Welds in valve stations shall be given the prefix "S", followed by the station number and then the weld number (e.g. S 2-21).

8.2 Weld Schematic

The weld schematic is a graphical representation of the weld joints of each chainage. It graphically represents the following;

a) Each pipe alongwith its number and heat number. Pipe color depicts its thickness. A mouse over on the pipe displays its details.

b) Each block represents a joint. Its color coding indicates its status, whether welded, NDT done or rejected, joint coating lowered, backfilled. The letter below each block indicate if the joint is a tie-in (T), free tie in (FT), re-take (RT), re-weld (RW) etc.

c) Click on any joint displays its weld history with links to inspection reports.

d) Below is the legend of symbols that will be used in joint graphical.

8.3 Weld Data Report

A detailed weld report having all joints welded with their status, welder number, WPS, electrode number etc. are displayed. A special query is generated for listing the cutout.

8.4 Quality Methodology

a) Error reports for all activities are generated online and will be sent to contractor as well as MECON.
b) PIMS generated exceptions for example; Duplicate pipe & joints, incorrect pipe number in report, unqualified welder report.
c) All data entry is verified by PIMS QA engineer.
d) Visual inspection of ITR's at site by PIMS engineers for any legibility / incorrect format / incomplete entries / ambiguous data etc.
e) Exception reports are submitted to the contractor alongwith the feedback form as below :

Sr. No.	Date of Reporting	Activity	Report No.	Non Conformity	Date submitted to contractor	Date Rectified by contractor

9.0 Crossings

PIMS software shall have details of crossing reports. The following information shall be configured as a minimum:

a) Crossing No.
b) Crossing Drawing
c) Name of Crossing
d) Type of Crossing (HDD, Thrust Casing, Open Cut)
e) Chainage Point from-to
f) Crossing Width
g) Permission Authority
   i) Authority Name
   ii) Date of Permission
   iii) Expiry of Permission

h) Stage Inspection Report

10.0 Station Piping

Generation of station piping DPR requires the following fields from the inspection report of each terminal;

a) SV Number (with scope of work for each activity).
b) Date
c) Report Number
d) Fit-up (Inch Dia)
e) Weld Visual (Inch Dia) Radiography (Inch Dia)
f) Manual UT (Inch Dia)
g) DPT (Inch Dia).

11.0 Snap Shot of Main Reports

11.1 Daily Progress Report

11.2 Joint Tie-in Chart

A joint tie-in chart report represents and gives detail of each joint from welding to backfilling. Tie-in and free tie-in joints, repaired joints etc. are also represented with respective legend as shown in below figure. Each joint will have UTM Coordinates.

11.3 S-Curve

11.4 Cumulative Chainage wise progress graphical

11.5 Cumulative Activity (Schematic)

11.6 Compliance Reports

Feature to query any left out activity for any joint within a range prior to lowering or hydro testing.

a) Pre-lowering compliance report generation.
b) Pre-hydro test compliance report generation.

Lowering compliance report gives the complete history of joints with the conformation that pre-selected is ready to lower with the details of calculated section length to be lowered. It gives exception of activities not performed or not reported.

11.7 Free Issue Reconciliation Report

a) Pipe Tracking Report

The pipe tracking report shall have the following minimum fields:

Despatch Date	Receipt Date	Pipe No.	Heat No.	Length	Dia	Thk.	Grade	Type	Coating Type	Mfg. Name	GRV no.	SIV no.	TC no.	Left Joint	Right Joint

The despatch date shall have the inspection release note/ inspection waiver hyperlinked to it. Also the GRV no. , SIV no. , TC no. shall have GRV, SIV and TC hyperlinked to them respectively.

b) Other Free Issue Material Tracking Report

Despatch Date	Receipt Date	Item Description	Size	Rating	Material	Mfg. Name	GRV no.	SIV no.	TC no.	IRN no.	Remarks

c) Reconciliation Report
The free issue material needs to be reconciled. The reconciliation shall be done as per the specification for reconciliation of free issue material attached elsewhere in the bid document. The software solution must have the ability to reconcile all the free issue materials.

11.8 Real Time Pipe Book Generation

The proposed software shall have the capability to auto-generate pipe book from digitized inspection reports. It should have provision to query fields, chainages and joint number range.

12.0 GIS Route Digitization & Layering

GIS vector / raster images and maps with links of all TP's having layered details chainage progress till date, digital pictures / documents / material list of special sections. Links should get dynamically

generated as and when data entry is done. Shape files containing the GIS system shall be handed over to the client for their reference.

a) Survey Information

i) Land Records
ii) Soil Corrosion Records
iii) Geo References

b) Local & External Data

i) Shape files of Alignment Sheets
ii) Imagery (Landsat, ICKNOS Quick Bird, SPOT) are superimposed

c) Crossings & Utilities

i) Location of Crossings, SV
ii) Photographs of Crossings
iii) Crossing Drawings
iv) NOC's Related Documents

d) Pipeline Route

i) Planed route on satellite imagery
ii) Structures and monuments in vicinity
iii) Layers of road maps superimposed by route.

12.1 Pipe Route Linkages

This graphical representation of the route has nodal points referenced against chainages for the following; SV/ IP station, turning points, crossings, KM posts, warning signs, city / town crossings and certain important landmarks. These points are hyperlinked to provide more details. Further click on a point gives descriptions like as date progress, digital video of special sections, IP stations, view related pipe book page, etc.

12.2 Corridor Management – Graphical

12.3 PIMS Alignment Sheet Generation

The proposed PIMS software solution shall have the ability to generate as-built alignment sheets. The survey data shall be digitized to generate the alignments sheets. During construction process, the contractor shall record GPS co-ordinates at each weld joint and based on them generate as-built alignment sheets. The levels/ cover at each joint should be collected from the laying contractor and

incorporated in the as-built alignment sheet. The mouse tip should display the UTM coordinate of a particular joint.

The web based, auto generated PIMS alignment sheet shall have all the features of the standard alignment sheet provided by the survey agency. The data used for generation should also be tabulated. The information to be shown in the alignment sheet layers is as follows:

a) Planimetry
   TP / IP Details
   Weld Coordinates, weld chainage

b) Crossings & Topographic Locations
   Crossings
   Geo-reference

c) Profile
   Ground level, pipe cover

d) Marker locations and details

e) PDI / Class

f) Pipe Types

g) Soil Resistvity

h) Soil Stratification

13.0 Electronic Documentation System

All construction reports, progress reports, test reports, specification and procedures etc. should be linked to the relevant data reports. Each document should be accompanied with unique meta-tags that can make a specific search easier later. The following aspects should be covered under this section;

a) Pipe information (Manufacturing history, inspection documents, raw material test certificates, test certificates of pipes and plates, inspection release note)
b) Other free issue material (valves, IJ, flow tee etc.) information (Manufacturing history, inspection documents, raw material test certificates, test certificates, inspection release note)
c) Pipe reconciliation statements
d) Material acceptance (Joint coating material manufacturers test certificates).
e) Manufacturers test certificates and site qualification test reports like filler material, electrode, epoxy etc.
f) Equipment data sheets and test certificates.

g) Procedure reports, Approved procedures, job procedures, welding procedures specification and qualification, QAP's and ITP's for all pipeline activities including terminals, SV stations, IP stations etc. Scanning and digitization of gazette notifications from owner. All construction activity reports including crossings.

h) Cadastral survey documents- Survey numbers, ownership area of affected of survey no. in ROU. Permanent feature along center of pipeline. Village maps, talukas, districts etc. Nearest police station with details, hospital, fire station, village panchayat, district authority details.

14.0 Material Management Reports

14.1 Material tracking and ordering reports are generated for both Free Issue Materials for long lead items and also for procurement related items.

15.0 ROU Tracking Report

ROU tracking report helps in tracking the ROU / Permission documents, compensation details would be linked.

16.0 Deliverables of PIMS solution at the time of final submission:

a) Mode of Delivery

Data will be submitted in installable CD's. A platform independent solution, that can be installed on desktops, servers and accessible through the network will be configured.

b) User Access

Apart from the delivered CD's, as built data can be provided in either of the following methods: a) Present on Secure Web Space. b) The data with platform independent menu Interface will be installed on a Server/PC. It can be accessed by users from a URL from other PC's within the network.

c) Interface:

All submitted data can be accessed using menu interface. All data is input from authenticated Inspection Reports/ Documents. These documents are also linked along each entry. Data generated using PIMS is exportable to MS Excel and may be used to Interpret with applications as desired by the client.

16.1 List of minimum Deliverable's, but not limited to the following:

a) Pipe-Book:
Complete pipe book with links to each inspection report and single click display of history of joints.

b) Electronic Documentation:
Approved documents, drawings, test certificates etc. scanned, linked and indexed.

c) Project Corridor management System:
Corridor manager with layers of raster images, topographic details, photographs, stations, crossings, markers, etc.

d) Material inventory:
Complete pipe tracking and reconciliation report with details.

17.0 Technical Specification of GIS Application and Services

17.1 Create Base Map along the corridor, having features like Roads, Water Bodies, Railways, important POI by remote sensing using Satellite Imagery and SOI sheets.

17.2 Create Shape Files for all Corridor Layer having Topographic details along 100M on either side of centreline.

17.3 Create Shape Files for Pipeline Centreline layers with pipeline joints, Depth, fittings and fixtures.

17.4 Create Shape Files for Cadastral Maps along with respective Landowner Data.

17.5 Create Geodatabase Segments, Line Series and Station Series for future analysis.

17.6 Attaching photos, videos, drawings, GAD's, Isometrics in related stations, crossings, utilities etc. to provide complete details of pipeline which helps O&M to identify the location, pipe details, joint details, related documents/drawings etc. for disaster management.

17.7 Loader module for Survey data to AutoCAD Map based alignment sheet.

17.8 Integration model for survey data to PCMS.

17.9 Loader module for Survey data and PCMS data in CLIENT Arc GIS GeoDataBase.

17.10 Ensure completeness of CLIENT GeoDataBase for all the Feature sets Locations and Tables.

17.11 GIS system should have features of Pan, Zoom, Info, Search, Measure and Print.

17.12 GIS system should have loader module for Survey data to AutoCAD Map based alignment sheet.

17.13 The GIS based management system should be able to handle the following applications:

a) Spontaneous potential graphing

b) Pipeline profiling

c) Handle CAD files which show the piping layout and other plan of the facilities

d) Images and scanned documents

e) Creation of alignment sheet from survey data

g) Inspection and material data updating and listing through a form menu

i) Record update and maintenance

j) Emergency notification lists display

k) Map creation

I) Identification of the pipeline network facilities; tolerance setting for the same

m) Query by location, by attribute, by logical selection (all queries based on logical selection parameters)

n) Report generation as per user needs

17.14 GIS system may have the following suggested layers:

a. Base Map layer
b. Satellite Imagery Layer
c. Pipeline Centre line Layer
d. Cadastral Map Digital Layer
e. Construction Activity Layers
f. Pipeline Assets Layer

18.0 SCOPE OF GIS SURVEYS

This specification covers the minimum requirements for implementation of GIS for surveyed pipeline route. This specification deals with data acquisition, data recording, storage handling, processing and development of GIS on a specified format using standard and approved quality control parameters and its delivery to owner in a fully customized fashion.
The work shall include but not limited to the following:

18.1 Survey along the pipeline ROW to capture GPS co-ordinates of weld joints, various pipeline markers (boundary pillars, kilometer post, direction marker, warning signs, etc.), despatch station(s), receiving station(s), intermediate pigging stations, consumer terminals etc. for preparation of GIS map of ROW.

18.2 Preparation of seamless GIS for the entire pipeline route with video clipping of salient features such as major crossings (Roads, Railway lines, Rivers, Nalas / Streams, Canals etc.) covering 5 Kms stretch either side of centre line of surveyed pipeline route. Any drawing/ documents if additionally required shall be the responsibility of the contractor. Generation of GIS module for the surveyed pipeline route, shall be capable of featuring the attributes as given hereunder:

a) Retrieve pipeline information like Chainage, Depth of pipeline, Dia. of pipe, coating details, CP details etc.
b) Route Map showing the alignment of the pipeline including crossings, TPs etc.
c) Major crossings such as National Highway, State Highway, Railways, Canals, Rivers, HDD etc.

d) Mainline Valve Locations, Despatch/ receiving stations
e) GPS coordinates of each weld joint during construction work to be taken immediately after lowering but before backfilling along with progress of mainline construction.
f) Cadastral Survey information including details of
   i) Survey Nos.
   ii) Ownership area of affected Survey no. in ROU
   iii) ROW Corridor
   iv) Permanent feature along 30 m either side of centre line of pipeline
   v) Village maps, Talukas, Districts etc.
   vi) Present crop details
   vii) Land & crop Compensation details
   viii) Land use pattern along the route

18.3 Incorporation of all permanent features, such as roads, railway lines/stations, water bodies, fire stations, important land marks etc. falling within the corridor width of 10 km on either side of the pipeline centre line. **The contractor shall arrange the satellite imageries, if required. Owner may facilitate the contractor (if required) by issuing authorization letters. However, the satellite imagery shall be procured by the contractor from authorized agency at his own expense.**

18.4 Scanning and digitization of Gazette notifications available with the owner. Scanning & digitization of EIA/ RA study reports, cadastral survey reports, soil resistivity reports, various crossing permissions, as built drawings, equipments details etc. Provision shall be kept for linking additional attributes as and when required in future pertaining to ROU related works.

18.5 The data so collected shall be re-verified to ensure correctness before their processing for the development GIS map of pipeline ROW, showing pipeline alignment and profile.

18.6 Provision shall be kept for system integration to existing CLIENT's SCADA network/ WAN.

18.7 All the data shall be uploaded to respective modules of GIS software developed by CLIENT.

18.8 Identification/ Generation of 3-D co-ordinates for turning points/ intermediate points along surveyed pipeline route, with the help of DGPS.

18.9 **Handheld GPS survey instruments with mapping facility**, shall be utilized for locating the intersection points/ turning points and other Geo-references, with its complete accessories of renowned make, **having 1 metre accuracy.**

18.10 The contractor shall impart training for operation and maintenance of software developed for Pipeline information system to two batches of CLIENT personnel, each batch consisting of up to 10 personnel.

18.11 The scope of work shall not be limited only to the work as described above. The contractor shall be required to execute all works required for generation of GIS module for the surveyed pipeline routes.

18.12 **GIS Surveys**

18.12.1 Contractor shall carryout development and customization of GIS for the surveys covered in the present scope of work that includes:

i) Geodetic engineering surveys
ii) Soil investigations/ survey
iii) Crossing surveys
iv) Cadastral surveys
v) ROU acquisition surveys records
vi) Population density surveys
vii) Land use pattern survey
viii) Soil resistivity survey / corrosion survey
ix) Disaster management requirement and environmental effect parameters.
x) System design for GIS and integration with owner's central data information system etc.

This GIS is to be developed in such a fashion that there is a complete scope for horizontal and vertical expansion for the system growth and Integration. Theme coverage/ layers for GIS shall be as per requirement frozen by owner at the System Design and Customization Stage.

18.12.2 The required features of GIS application shall be as given below:-

i) The entire system to be geo-referenced, i.e., from the point of dispatch to receipt station including the facilities at each end as well as en-route, the major crossing, landmark etc. shall be as per grid and projection system to be approved by the Owner. The GIS application should have pipe book data, materials data, alignment sheets (AFC and As built) and all related certificates available spatially on GIS layers in such a way that all the above details can be opened through the GIS application directly . This shall also involve (but not limited to) taking GPS coordinates of each weld joint during construction work immediately after lowering but before backfilling along with progress of mainline construction. The Pipeline construction activities such as ROW Clearing, Grading etc should be available spatially as GIS layers so that all the above details can be opened through the GIS application directly.

ii) The Contractor shall submit a Quality Assurance Plan (QAP) which shall cover details of each activity, its scope, quality parameters, quality checks, inspection schedules, attributes for input and output/ deliverables, test check procedures and its correlation with implementation schedule. The QAP will be scrutinized, commented upon and approved by the Owner for implementation.

iii) The Contractor shall deploy the best-suited methods, equipment, tools software, personnel, analyst and surveyors to carry out the development and customization of GIS.

iv) The Contractor shall use the best and the approved quality material for preparation of maps, reports, software, storage mediums etc. Base maps of all the districts (50 km on both sides of ROW) are to be supplied & integrated in the system by the bidder & these maps should have clearance from **Ministry of Defence or Survey of India.**

v) The Contractor shall confirm having in his possession the requisite tools equipment, know-how and experience to carry out the development of GIS including facilities to handle, to process and deliver output from the satellite imageries. In case the contractor decides to tie up with an associate for this part of scope, the details of such sub-vendor/ associate shall be furnished along with the offer.

vi) The development of GIS shall be thoroughly customized to suit owner's requirement on technical, organization, training, operational information management system areas and integration with existing / proposed organizational systems for planning, control and information management.

Wherever owner is not in a position to clearly specify any individual attributes/ fields of information at the execution stage, adequate provision for implementation at a later stage would be created in the respective system for such cases.

vii) Contractor to comply with Open GIS Consortium (OGC) data standards or as approved by EIC.

viii) Development of GIS package shall be done using standard programming languages like visual basic, visual C++, java, oracle etc,

18.12.3 Contractor's scope of work shall include the following:

i) Preparation and submission of implementation schedule, QAP and detailed methodology for security and approval of the same by owner.

ii) Collection of input data, topo sheets, and satellite imageries based surveys maps, reports and store/handle for further processing with contractor's survey work.

iii) Propose projection parameters, special data parameters, grid system, geo-coding and geo-referencing parameters, output/ deliverable parameters etc., for owner's approval.

v) Carry out data validation of received input, carry out scanning of topo-sheets, and integrate the recordings made by GPS/ DGPS and other survey instruments to complete/collate the input data.

vi) Carry out image processing and generation of rectified image on approved system like ERDAS IMAGINE or equivalent.

vii) Carry out interpretation and digitization of all physical features symbolization/ legend structure, layering, edge matching, topographical integrity, mosaic king, database linking, incorporation of ground truth details, incorporation of processing techniques for attribute allocation etc. after passing through quality assurance stages as per approved QAP.

viii) Generation of output maps in specified format and scale as per specification.

ix) In the cross-country zone all information as given in the technical specification shall be provided. In the densely populated portions all information requirement as per specification for detailed survey and cadastral survey shall be incorporated such as ward and property boundaries (house numbers, classification as residential, commercial, government, number of storeys etc.) roads, landmark features, locality names and connectivity with proposed facilities, major commercial and industrial establishment being studied as potential consumers etc.

The data to also include, nallahs, channels, drains, canals, existing electric and telephone lines, bridges, land crossings, proposed expansion of roads, railways, other facilities e.g.water supply, sewerage system, telecommunication networks etc.

Note: Contactor to collect, evaluate, ensure correctness of source, positional accuracy, ownership, attributes, authenticity of the data collected and only revalidated data to be include for the database.

x) To customize each layer and attribute for present available data and future database as per requirement of the owner. To design system requirement for operation and maintenance of GIS package.

xi) To deliver a draft GIS package to the owner along with a detailed demonstration scrutiny, trial run and observations; load the trial packages on owner's system and configure for optimal use.

xii) To modify/ change and update GIS with respect to the finally approved survey reports and mapping carried out under the overall scope of work. Observation and detailed comments on submission by contractor at each stage of work, correction/ modifications and addition to route or methodology, etc shall be carried out by contractor. To provide training to the owner's engineers on development of GIS as per approved schedule.

xiii) To deliver the owner the source code of the application package with proper documentation.

xiv) To customize the GIS package as finished products and deliver to Company sets of O&M manuals and package and provide post delivery support services (software updating etc.) of operation and maintenance for a period of 3 years from the date of installation of complete system. For GIS server application server and desktop editing software, however, the successful bidder will provide one year software product warranty which includes both software upgrade update and technical support and next two years of technical support only on need basis (monthly at least) by authorized technical person of OEM. Maintenance of package during the period shall be provided at no additional cost to the Owner.

Pipeline Survey & Route mapping

a.	Survey of the Pipeline Route Corridor and ROW	To be done as per details given under technical specification and Scope of work
b.	Accuracy of GPS Survey instruments/equipments	+/- 1 meter
c.	Capturing of Geospatial features of the Pipeline Corridor	To Be done as per details given under technical specification and Scope of work
e.	Digital Mapping of the Pipeline Route Corridor	Using Survey of India Maps / Other reputed map providers / Custom made map
f.	Digital Mapping formats to be used	Map info/ Shape file

18.13 **GIS Management Solution:** It should be able to archive the following measurements and details related to mainline route/ profile/ drawing and pipe books:

a) Horizontal location of pipeline with regard to deviation and permanent grid pillars

b) Vertical level with regard to mean sea level of pipeline and grade

c) Location and type of bends, fittings etc. and grades, points of intersection

d) Changes of wall thickness and materials

e) Location and details of valves insulating joints fencing

f) Location and details of bored/ cased road, railway, water crossing, suspension bridges

g) Location and details of bored crossing pipes, vents

h) Location and type of coating

i) Location and type of weighting, anchoring

j) Location and type of markers

k) Location of further appurtenances (pig-signallers)

l) Location of ROU and end of pipeline with respect to ROU

m) Type of soil

n) Type of rock

o) Type of blasting and ripping

p) Padding

q) Type of road pavement

r) Details of bank protection, number of insulators, seals

18.14 Following layers (but not limited to- only indicative) are to be populated in the GIS solution. The information contained is also indicated in the layers:

a) Route Survey Input

This layer group contains information extracted from the Route Survey Final reports, including:

- Soil Stratification Report
- Temperature Measurement Records
- Soil Corrosion Report

b) Cadastral layer

This layer group contains all map format files, images and tabular data Obtained from local government or other external sources. All Cadastral Data, Landowner details and compensation to the farmers shall be Included in this layer.

c) Site Photo and Video details

This layer contains all photos and video clips from the sites which are spatially linked to the database.

d) Crossings details

All information regarding pipeline crossings (all crossings like river, HDD, roads, canal, railway line, foreign pipeline crossing, power transmission line etc.) are stored and presented in this layer group. Location, type and width of crossing is stored in attribute table of crossing layers.

e) Pipeline Routes

Pipeline routes, IPs, KP markers, history of routes and reroute layers are all collected in this group layer. TLP points, OFC points, valve location, coat & wrap details, pipe depth, CP details etc. will also be marked in this layer.

f) Logistics

All approach roads map is scanned, geocoded and imported to GIS, then suitable access routes are digitized on the map which illustrates an idea of accessibility of site from different access roads.

g) Satellite imageries

All satellite imageries are grouped in this layer group. Different visibility Scales are defined, so that by zooming in & out suitable satellite imageries become visible.

h) Important details

Plans of detailed survey collected from alignment sheets are put together and presented as a stand-alone layer which presents useful details of obstacles and features like Police station, post office, fire brigade, delivery station, major road, minor road, railway pond, river, forest land, CRZ (Coastal Regulation zone), restricted ROW, Common ROW, marshy areas, rocky areas, in the vicinity of the

pipeline based on detailed survey.

i) Geology

Geological maps, fault maps, hazard maps and other relevant maps from reference books and journals are to be scanned and geo- referenced.

18.15 An indicative list of requirement from the GIS application is given below as minimum which should be available in the system :

1.	System Architecture	Web based
2.	Accessibility	Through Internet and intranet
3.	Compatibility	Compatible (with zero data loss) with industry standard mapping formats such as shape file/ Geo Database etc.
4.	Map integration with pipeline digital mapping	Integration with pipeline digital mapping of the pipeline route corridor and ROW.
5.	Integration with Google Map/Earth	Viewing pipeline data on top of Google map/Earth/ Bing Maps etc.
6.	Map Overlays	Facility to switch ON/OFF pipeline map Overlays
7.	Search/Query Features	Facility for Search/ Query on Pipeline data through web interface
8.	Scalability	Scalable to incorporate new Pipeline Data (whose data are provided in industry standard map formats)
9.	Modularity	Facility to accommodate new users/groups/pipelines as and when required
10.	Flexibility to change Communication Service Provider	Required
11.	Facility for updating of data at owner's end	Required
12.	Browser Compatibility	Compatible with Web Browser such as Internet

18.16 **OTHER REQUIREMENTS OF PIPELINE INFORMATION MANAGEMENT SYSTEM**

18.16.1 The software system/package of data information management system shall be able **to function on a LAN/ WAN, restricted to 100 users, with provision of security.**

18.16.2 The customized/ developed software should have

a) Input data validation.
b) Control of internal processing
c) Output data validation

18.16.3 The system shall enable quick retrieval and printing of relevant pipeline data/ as built information through a suitable application. It shall also be able to provide requisite information in following formats.

a) Tabular reports
b) Graphical representations of data
c) Image (supporting document) retrieval
d) Geographical information system
e) Query based retrieval

18.16.4 The volume of documents/ information to be scanned and uploaded in the system shall be decided based on the requirement and shall be finalized in consultation with the Engineer -in - Charge.

18.16.5 The data captured from the scanned documents and alternate electronic data into the central database through extensive manual data entry and electronic validations.

a) The GIS module of the application shall also function on a LAN with an Internet connection. **Contractor shall provide license access for this**.

18.16.6 Generation of as built alignment sheets based on chainage shall be provided in the scale as decided by the Engineer in Charge.

18.16.7 The system shall include the following :

a) A run time version of the software
b) The database with relevant licenses for standard usage
c) Assistance for operation and maintenance of system (towards hand on / class room training etc.) for three years from the date of installation of the complete system.

18.16.8 Contractor shall be responsible for following up with the owners representative for collection of various QA/QC documents, daily inspection reports, equipments test certificates, as built drawings etc. **Contractor shall also be responsible for the manual data verification** (reports are verified for general errors like missing pipe number, missing heat number, repeated pipe number, missing supervisor signatures etc) before making data entry and publication into the system.

18.16.9 Contractor shall provide access of published data to the authorized users of owner over secured Internet/ WAN Network in the form of **web-based reports**.

18.16.10 The scanned reports shall be given **identification code**/ name using a formal coding / naming convention as agreed upon between the owner and contractor. The reports shall be visually checked to ensure presence of identified mandatory information.

18.16.11 The data shall be protected through appropriate security systems and access shall be controlled using **access control systems**.

18.16.12 The Contractor shall submit along with offer the project organization detail, the plan for execution of work, execution methodology, quality control plan and project monitoring & control mechanism details for development of data management system.

18.16.13 The Contractor shall submit a **weekly progress report** of the work assigned to him for monitoring the progress of the work

18.16.14 After acceptance of the system all software used in the data management system shall be supplied in CD/ DVD media and shall be licensed to the owner with certification to this effect. The owner shall be enabled to access all free downloads/ updates for the software provided as per contract. The bidder shall ensure registration of the owner of such facility with the respective software supplier and confirm. The license of the GIS server application server and desktop editing software should be in the name of CLIENT. If any software media is damaged / corrupted during the process of installation and commissioning, the contractor shall ensures replacement of media at his own risk and cost.

19.0 OWNERS RESPONSIBILITY

19.1 Owner's responsibility shall be limited to provide/ making available the drawings/ documents/ data required for providing services for implementation of Pipeline Information Management System. All other resources, logistic support, facilities, etc required to complete the work under the scope shall be arranged by the contractor himself without any cost to the owner.

The owner may also provide authorization letters, wherever required for collecting information/ data from Owner/ Owner's representative and other contractors/ vendors.

20.0 CONTRACTOR'S/ PIMS SERVICE PROVIDER'S PERSONNEL & EQUIPMENT

20.1 The persons employed by the Contractor / PIMS service provider shall be technically qualified and trained in development of requisite software and operation of various computer applications. **They should also be acquainted with pipeline construction.**

20.2 The contractor shall provide boarding & lodging arrangement for his personnel at all locations during execution of work under the contract. The contractor shall also provide boarding, lodging and transport arrangement for his personnel during visit to ROW for collection of data for GIS mapping.

20.3 The contractor shall provide insurance coverage of all his personnel employed for implementation of work under this contract.

21.0 DOCUMENT/ DATA SUBMISSION

21.1 Contents and presentation of GIS Module shall be reviewed/approved by owner in the initial stage to be prepared by the Contractor. The Contractor shall incorporate all comments / suggestions given by owner and prepare all documents accordingly.

21.2 Two sets of paper copy of GIS Module developed shall be submitted by the Contractor for owner's review in the form of draft report immediately upon start of work. The contractor shall obtain approval of owner on draft report before final submission. Comments, if any, shall be incorporated by the Contractor. Report can be demanded in parts and in different phases as per discretion of the owner.

21.3 All drawings, report, formats etc. forming the part of submission to owner shall be prepared on electronic media.

21.4 Final drawings/ data / documents after incorporation of comments by contractor shall be submitted to owner in six sets paper copies and one copy on CD ROM/DVD.

22.0 SECURITY

The network used for data transfer should be secure:

22.1 Bidder should ensure that a clear description of the security attributes of all network services used is provided.

- Data transfer using Internet
- Bandwidth requirement for data access from (during construction phase) is to be furnished.
- Public Key Infrastructure:

22.2 The **digital signatures and security tokens** system should be under hardware warranty and software support for three years from the date of installation of the complete system.

22.3 The web server should conform to the guidelines issued by "CERT-IN"

22.4 The successful bidder shall develop and install state-of-the-art security systems including all types of modern protection security systems, **like "SSL VPN** to protect the software system and all the data base and confidential information of the CLIENT which would be kept on line to support the software system. The **SSL VPN** system should be under hardware warranty and software support for two years from the date of installation of the complete system.

22.5 It is the responsibility of the successful bidder to ensure that there is no security backdoors and loopholes existing in the solution that can be exploited. The Contractor shall wholly be responsible for any breach in security as a result of insecure implementation or loopholes in the solution, including the operating systems on which the systems are running.

22.6 There should be one time authentication. However, a guest user id may be there through which any user can see the documents available for public notices.

22.7 Unauthorized user shall not be allowed to access to any of the Data.

22.8 The Contractor shall establish an **access control matrix** for the system.

22.9 The proposed system shall be equipped with security facilities to prevent data tampering, data theft, sabotage and virus attack.

22.10 A parameterized, timeout and logout feature may be included for non-active sessions.

22.11 The proposed system shall be equipped with database security access control to ensure the integrity of data during processing and updating of the database.

22.12 The Contractor shall propose Application level access control to control the user's access to the application he/ she can access.

22.13 The system shall be capable of invalidating any user after a specific number of attempts to gain access via invalid passwords.

22.14 There shall be mechanisms to verify the authenticity and the integrity of the network services from un-trusted sources before the services are used.

22.15 The audit trail solution shall be able to detect attempts of unauthorized access, security violations, logging staff's activities as well as any suspicious activity and alert the system owner using appropriate channels such as audible alarm, pager, e-mail or other interactive technology based on the criticality of the intrusion detected.

22.16 The proposed security implementation shall be easy to administer, verifiable and sustainable. It shall be able to scale to cater for additional servers for future expansion programs.

22.17 Application Security Assessment (Source code review) of the complete customized application should be done by CERT-IN empanelled organization (the organization should be in cert-in panel since 2006) covering OWASP's Ten Most Critical Web Application Security Vulnerabilities. A confirmation certificate is to be provided by the auditing organization. The cost of hiring third party is to be borne by successful bidder.

APPENDIX–II TO PIMS PJS

RESPONSIBILITY MATRIX

1.0 Project Responsibility Matrix

RESPONSIBILITY MATRIX		
Activity	**PIMS Contractor**	**CLIENT/ MECON**
Deployment of manpower for scanning, cataloguing, data entry of all reports along with GPS coordinates acquisition staff	√	
Deployment of hardware for the project implementation like desktops, server and scanner	√	
Insurance of PIMS contractor's equipment/ hardware	√	
CD's/DVDs and alternate consumables for backing up of data	√	
Consumables for scanning	√	
Organizing the onsite team's travel to site	√	
Application hosting for ensuring availability of information to external users	√	
Desktops for viewing web reports and GIS by the IOCL team (Standard configuration PC's with Windows operating systems, Internet explorer and MS Office). GIS module: 2 machines, Web Reports as per owner requirement	√	
Boarding and lodging for contractor's operators' deployed at site office.	√	
Local transport / conveyance for commuting to onsite location from the place of Boarding and commuting on the ROW for the GIS survey on a four-wheeler. (it would be in the interest of the contractor to accommodate the onsite team close to owner's office to take care of the logistics)	√	
Provision of appropriate office space for the onsite team to carry out their activities efficiently	√	
Provision for storage of documents that are classified by the contractor as Work In Progress	√	
Safe storage of the back up CDs/DVDs/ media/ pendrive *till such time the complete data is taken over by the owner.	√	
Provision of Internet connection for communication, E-mail and uploading and downloading of scanned documents	√	
Provision of telephone connection for usage by the onsite team	√	
Provision of Stationery for the onsite team	√	

RESPONSIBILITY MATRIX

Activity	PIMS Contractor	CLIENT/ MECON
Availability of procedure documents pertaining to all activities to be carried out by owner to onsite team	√	
Availability of isometric drawings to the onsite team	√	
Provide equipment certificates & certificates for all other assets deployed for the pipeline construction		√
Delivery of all required reports on end of day basis to the onsite team	√	
Soft copy of AUT (IF APPLICABLE)		√
Availability of authority letters for contractor's personnel to carry-out operation for executing the scope of work as required by owner.		√
Information pertaining to owner's routine processes required by the contractor for proper execution of contracted work	√	
Allocation of a project coordinator from owner to coordinate / Liaising with the onsite team/ Laying contractor, Should have the thorough knowledge of pipeline route and its important indicators, markers and intermediate structures	√	
Monthly audit of data in GIS based software system by Owner's personnel	√	√

2.0 Bidder to submit a responsibility matrix covering the complete project implementation and clearly outlining the scope of work being covered by them.

3.0 Bidder shall procure the satellite imagery for implementation and shall facilitate and manage this activity as per detailed specification.

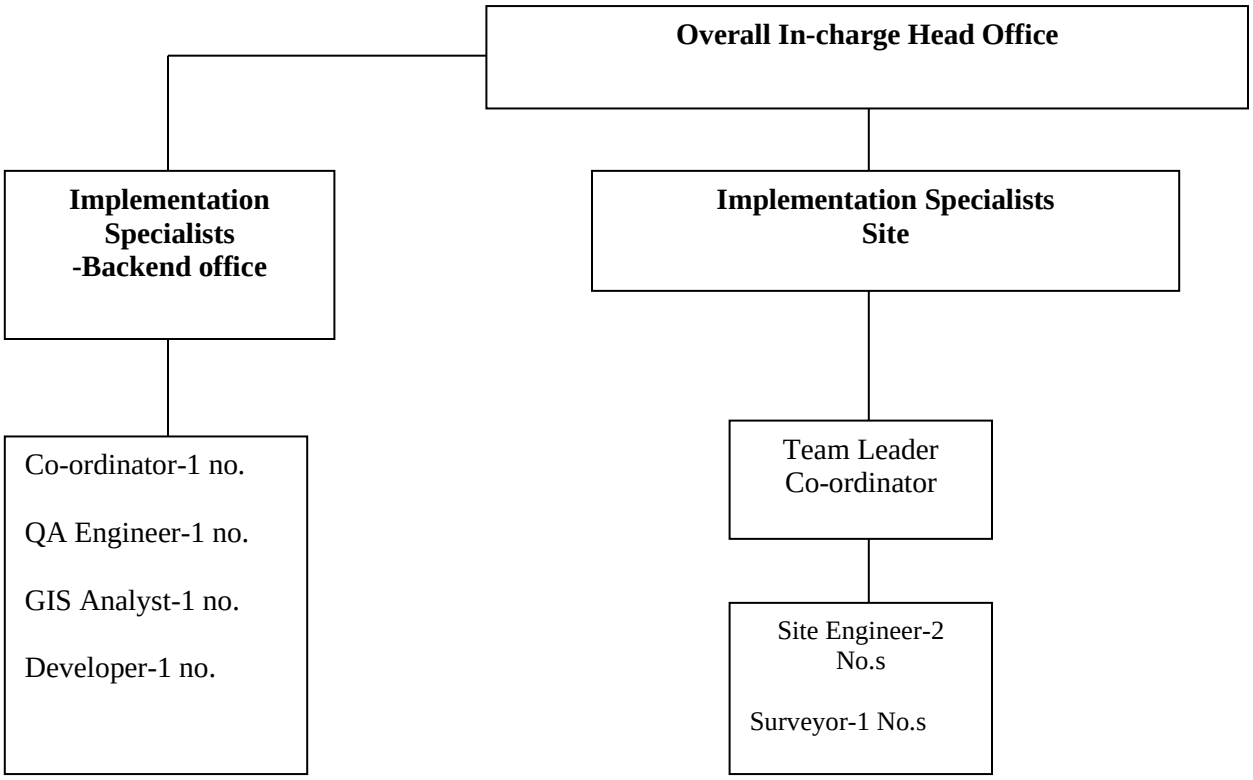
APPENDIX–III TO PIMS PJS

PROJECT EXECUTION ORGANOGRAM FOR PIMS

PIPELINE INFORMATION MANAGEMENT SYSTEM FOR PIPELINE PROJECTS

ORGANOGRAM FOR PIMS CONTRACTOR

TYPICAL ORGANOGRAM



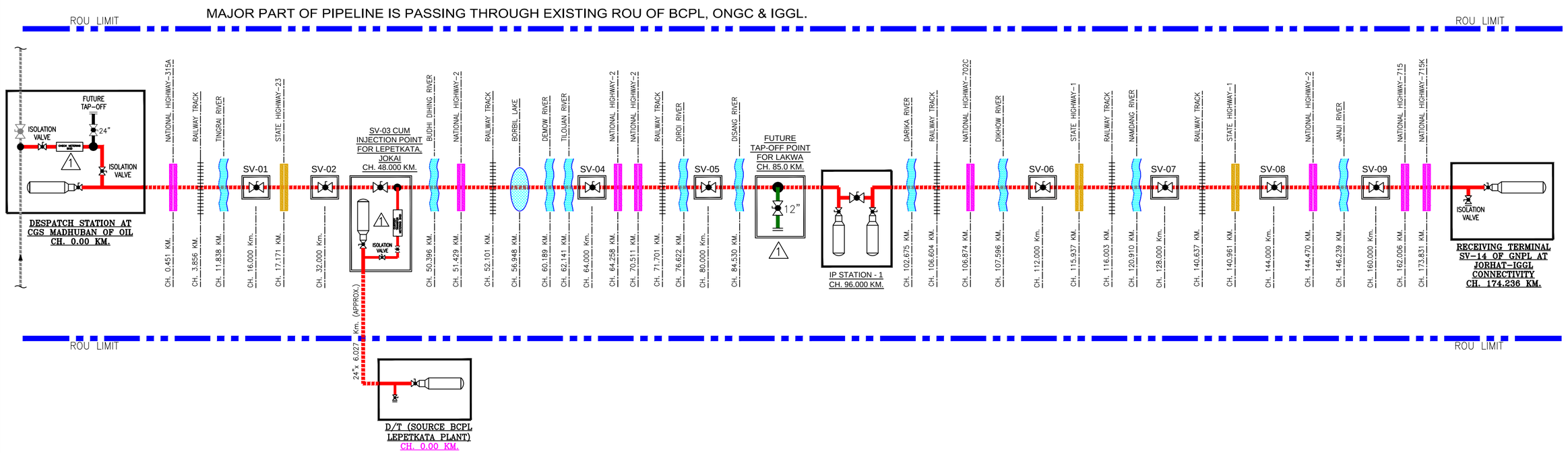
APPENDIX–IV TO PIMS PJS

PIPELINE SCHEMATIC ROUTE DIAGRAM

DRG. DRG. NO. MEC/05/28/E/0085/M/1021

SCHEMATIC ROUTE DIAGRAM FOR DULIAJAN FEEDER LINE

24"NB Ø x 174.236 Km. DULIAJAN FEEDER LINE(FROM CGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY) & 24"NB Ø x 6.027 Km. APPROX. (FROM BCPL LEPETKATA SOURCE TO LEPETKATA INJECTION POINT)



LEGEND

- 24"Ø PROPOSED PIPELINE
- RIVER
- NATIONAL HIGHWAY
- STATE HIGHWAY
- RAILWAY LINE
- LAKE

RT : RECEIVING TERMINAL
DT : DESPATCH TERMINAL
TOP : TAP-OFF POINT
IP : INTERMEDIATE PIGGING STATION
SV: SECTIONALISING VALVE STATION

DULIAJAN TO JORHAT

SL. NO.	DESCRIPTION	QUANTITY
01	RAILWAY CROSSING	06 NOS.
02	NATIONAL HIGHWAY	08 NOS.
03	STATE HIGHWAY	03 NOS.
04	RIVER	10 NOS.
05	LAKE	01 NO.
06	NALA/DRAIN	80 NOS.
07	POND	28 NOS.
08	BT, WBM, CC ROAD	117 NOS.

LEPETKATA SOURCE TO INJECTION POINT

SL. NO.	DESCRIPTION	QUANTITY
01	NALA	04 NOS.
02	BT ROAD	02 NOS.

△1

SL. NO.	DESCRIPTION	SIZE	LENGTH (IN KM.)	DT	RT	IP	INJECTION POINT CUM R/T	FUTURE TAP-OFF	SV STATION
01	(FROM CGS MADHUBAN OF OIL TO SV-14 OF GNPL AT JORHAT-IGGL CONNECTIVITY)	24"	174.236	01	01	01	–	01	09*
02	INJECTION POINT FOR LEPETKATA, JOKAI TO SOURCE BCPL LEPETKATA PLANT	24"	6.027	01	–	–	01*	–	–

* THE SV-03 OF DFL LINE AND R/T CUM INJECTION POINT FOR LEPETKATA ARE ENVISAGED IN THE SAME PLOT.

INDRADHANUSH GAS GRID LTD.

मेकॉन लिमिटेड

MECON LIMITED

NOTES :-
1. THE ABOVE DRAWING HAS BEEN PREPARED ON THE BASIS OF REVISED SURVEY & PDI DATA PROVIDED BY M/s IGGL. VIDE EMAIL DATED 29.04.2026.
2. CROSSINGS SHOWN IN SCHEMATIC DIAGRAM ARE IN-LINE WITH IGGL EMAIL DATED 15.05.2026.
3. THE PAVOJAN TAP-OFF POINT HAS BEEN CONSIDERED AT D/T CGS MADHUBAN IN-LINE WITH MEETING DATED 12.05.2026.
4. LOCATION OF SV'S IS TENTATIVE AND ONLY FOR PLANNING PURPOSE.
5. FOR PLACEMENT OF SV'S NO CONSIDERATION HAS BEEN GIVEN TO NEAREST APPROACH ROAD IN LINE WITH DISCUSSION WITH IGGL. FINAL LOCATION OF SV SHALL BE DECIDED BY IGGL IN LINE WITH CODE PROMISIONS.

REV NO.	DATE	DESCRIPTION	BY	VERIFIED
1	18.07.26	REVISED AS MARKED AS PER REVISED P&ID (R-2)	VIKASH	R.BAJAJ

REVISION

REFERENCES | DOC NO./DRG. NO.

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SECTION	OIL & GAS
LOCATION	DELHI
DESIGNED	VIKASH
DRAWN	SUNIL
CHECKED AND VERIFIED	RAJNISH BAJAJ
APPROVED	(S. GUPTA)
DATE	19.05.2026

DULIAJAN FEEDER LINE (DFL)

SCHEMATIC ROUTE DIAGRAM

SCALE : N.T.S | SH. 1 OF 1 | REV 1

DRG. NO. MEC/05/28/E/0085/M/1021

CONCURRED BY

APPENDIX–V TO PIMS PJS

CHECK LIST FOR TECHNICAL SPECIFICATION

CHECK LIST FOR TECHNICAL SPECIFICATION

Sl. No.	Description	Bidders Response	Remarks
1	Bidder to confirm full compliance to Technical Specification as per Tender		
2	Bidder shall ensure that all information/ documents with respect to Pipeline Information Management System are submitted along with the offer.		
a	Bidder shall ensure that duly signed, stamped and accepted Technical specification without any deviation is enclosed.		
b	Bidders Organogram for Execution along with Detailed Execution Methodology and detailed schedule bar chart are enclosed		

Note: Bidder to Tick in the appropriate box.

(Bidder's Signature with Stamp)

Annexure-IX
to
Particular Job Specification
(SUPPLY OF BARE LINE PIPE)

Particular Job Specification for Supply of Bare Line Pipe for Duliajan Feeder Line Project of IGGL

A Line Pipe:

A.1 Scope of Supply

Supply of Bare Line Pipes (without any External/ Internal coating), transportation to Contractor's dumpsites / storage yard, development of dumpsites/storage yards including all arrangements and maintenance, material handling, unloading, stacking and loading of pipes of all bare line pipes.

The contractor shall be completely responsible for the design, materials, fabrication, testing, inspection, preparation for shipment, transport (pipe plant to warehouse and from warehouse to ROU), storage at specified Dump Yard/ Warehouse of the below items strictly in accordance with the PJS, Technical Specifications, Amendments to Technical Specifications & Inspection test Plans (ITPs) and all attachments thereto and other terms & conditions referred in the tender document.

Item No.								
	Description: Supply of Bare Line Pipes as per API 5L PSL-2 (46th Edition), Technical Specifications No. MEC/TS/05/21/012B, Amendment to Technical Specification and ITP no. 05/21/12B/002 and PJS.							
	Pipe Size (NB) Inch (mm)	**WT (mm)**	**Ends**	**Std./ Code & Grade**	**Finish**	**Qty. (meters)**	**Manufact-uring Process**	**Color Marking on Pipes**
I	24" (610)	12.70	PE	API 5L X-70	Bare	285	SAWL	Violet,

Abbreviations:

SAWL - Submerged Arc Longitudinal Welded
OD - Outside Diameter
WT - Wall Thickness
API - American Petroleum Institute
PSL - Product Specification level
PE- Plain End (Ends shall be beveled as per API 5L)

A.2 IMPORANT NOTES TO PJS:

1. Items I & II shall be manufactured by LSAW process only and shall be supplied in bare conditions without any external/ internal coating.

2. Color bands of 50 mm width to be placed at both the ends, inside of Bare Pipes at a distance of 50 mm from the pipe ends.

3. Raw Material (Steel Plate/ HR Coil) Inspection will be witnessed by Contractor appointed TPIA. TPIA shall issue MTC as per EN 10204-3.2 certification. Contractor/ Vendor shall submit QAP/MPS for procurement of raw material before start of production, to be reviewed under reference category, to MECON/IGGL.

4. Inspection of Pipes by Contractor/ Vendor appointed TPIA shall performed as per approved QAP and TPIA shall issue MTC as per EN 10204, 3.2 certification.

5. All cost towards inspection by TPIA, as per scope defined in the approved QAP, shall be borne by the Contractor.

6. Inspection of Pipes shall also be performed by MECON/IGGL as per approved QAP.

7. Land for Delivery location/ Storage Yard shall be in the scope of the Contractor. All cost towards storage and maintenance of

A.3 Works associated with Ware House/Storage yards

Contractor will be responsible for maintaining suitable warehouse facilities including preservation, traceability, security and insurance at place as defined in this PJS. The size of warehouse shall be adequate for storage of maximum quantities.

Contractor shall develop the Ware House area required for stacking/storing of specified quantity of bare pipes. Bidder shall carry out in this regard all civil works within the Ware House required for temporary storage of pipes in all types of soils such as site grading, clearing, cutting, leveling, filling-up, providing temporary internal roads duly compacted for movement of cranes/trailers within the Ware House. Contractor shall also provide adequate drainage within the Ware House. All leveling, dressing and consolidation works shall be carried out as per the instructions of Company Representative.

Contractor shall develop a detailed development plan of Ware House including approach road so as to ensure safe handling of pipes and free movement of trailers.

The bare pipes within the Ware House may be stacked by placing them on ridges of sand free from stones and covered with a plastic film or on wooden supports provided with suitable cover. Supply of sand and other materials shall be in Bidder's scope. This cover may consist of dry, germ-free straw with a plastic film, otherwise foam rubber shall be used. The support shall be spaced in such a manner as to avoid permanent bending of the pipes. Bare pipe stacks shall consist of limited number of layers so that overstressing & deformation of the pipe is avoided.

A.3 GENERAL INSTRUCTIONS

1. COMPLIANCE WITH SPECIFICATION

The Contractor shall be completely responsible for the receiving/ taking over, design, materials, fabrication, testing, inspection, preparation for shipment, transport, storage at specified Dump Yard/ Warehouse of the above items strictly in accordance with the PJS and all attachments thereto.

2. INSPECTION

Inspection shall be in accordance with EN 10204, 3.2 certification shall be issued for each dispatched pipe.

Contractor & Coated line manufacturer shall appoint anyone of the TPIA for inspection purpose separately & will not be the same agency. Contractor & Coated line manufacturer has to intimate the TPIA name from the list of Third Party Inspection Agencies specified elsewhere in the tender document.

Apart from inspection by TPIA, Inspection shall also be performed by IGGL and or its authorized representative / MECON and or its authorized inspection agency (AIA), as set out and specified in the codes and particular documents forming this PJS.

Contractor/ Vendor shall provide two separate offices along with furniture for IGGL and MECON/ TPIA personnel for entire duration of the pipe manufacturing/Coating. AC Office shall have table/ Chair/ internet connectivity/stationary/courier and printing facilities for inspection officers for round the clock inspection during pipe manufacturing.

3. CERTIFICATION

The vendor shall be completely responsible for the design, materials, fabrication, coating, testing, inspection, preparation for shipment, loading of the above item strictly in accordance with the PJS and all attachments thereto. All items shall be provided with EN 10204, 3.2 Certification.
The steel plate/coil required for pipe manufacturing shall also be certified as per EN 10204, 3.2 Certification.

4. Procurement of Steel Plates/ Coils

List of acceptable Steel Plate/Coil Manufacturer

The following steel manufacturers are acceptable for the supply of Steel Plates/Coil to be used in the manufacture of quoted line pipes. The Pipe manufacturer shall furnish specific confirmation for compliance to specifications from any of the proposed steel plate/coil manufacturer(s).

For Plate (Upto X-70)

1. Mannesmann Salzgitter Roehrenwerke, Germany
2. Dillinger, Germany
3. JSW Steel, USA

4. Ilva, Itay
5. Azovstahl, Ukraine
6. Arcelor Mittal,France/Germany
7. Voest Alpine, Austria
8. Sumitomo Metal, Japan
9. Nippon Steel, Japan
10. Usimians, Brazil
11. Posco, South Korea
12. JSW Steel Limited, Anjar (earlier Welspun PCMD)
13. Baoshan Iron & Steel Co. Ltd, Shangai, China
14. Arcelor Mittal Nippon Steel India (earlier Essar Steel, India)
15. Jindal Steel & Power Ltd,Angul (up to WT 20.6 mm)
16. Rourkela Steel Plant (SAIL) (up to WT 23.8 mm)

For Coil (Upto X-70)

1. Thyssen Krupp, Germany
2. AHMSA (Altos Hornos De Mexico), Mexico
3. Baoshan Iron & Steel Co. Ltd, Shangai, China
4. Wuhan Iron & Steel, China
5. US Steel Kosice, Slovak Republic
6. Arcelor Mittal Nippon Steel India (earlier Essar Steel, India)
7. Erdemir, Turkey
8. Posco, South Korea
9. TISCO (Group) Co. Ltd, China
10. Maanshan Iron & Steel Co. Ltd., China
11. Jinan Iron & Steel Co.Ltd., China
12. Benxi Iron & Steel, China
13. Jiangsu Shagang (Group), China
14. Shou-gang Qian Iron & Steel Co. Ltd., China
15. Hyundai Steel, South Korea
16. Hadeed Saudi Iron & Steel Co., Saudi Arabia
17. Hunan Valin Lianyuan Steel Co.Ltd. China (Arecelor Mittal Group)
18. Arcelor Mittal,France/Germany
19. Anyang Iron & Steel Group Co.Ltd. China
20. Angang Steel Co.Ltd., China
21. HBIS Hebei Iron & Steel Group Co.Ltd, China
22. Megasteel, Malaysia (WT up to 10.3mm)
23. JSW Steel Limited, Dolvi, India (earlier Ispat (WT up to 11.7mm)

24. SAIL, Bokaro,India (WT up to 11.1mm)
25. JSW Steel Limited, Vijayanagar, Bellary, India
26. Tata Steel Limited, Jamshedpur (up to API 5L X-60 & WT up to 9.35 mm)
27. Tata Steel Limited, Kalinganagar (WT up to 16.0 mm)
28. Tata Steel Limited, Meramandali (WT up to 12.7 mm)
29. Inner Mongolia Baotou Steel Union Co. Ltd. China (WT up to 12.8 mm)
30. Baosteel Zhanjiang Iron & Steel Co. Ltd., China (WT up to 12.8 mm)
31. Jindal Steel Power Ltd, Raigarh (up to WT 16.0 mm)
32. Jindal Steel Odisha Ltd. (JSOL) (up to WT 12.7 mm)
33. SAIL, Rourkela Steel Plant, Rourkela (Grade up to API 5L X-70 & WT up to 16.0 mm)

(Legend WT: Wall Thickness)

B Line Pipe manufacturer with approval of IGGL/ MECON shall be considered for procuring Line Pipe subject to meeting the following criteria:

a) The manufacturer shall have valid license to use API monogram on line pipes with product specification level PSL-2 quality from the proposed pipe mill/(s) & have track record for manufacturing of API 5L (PSL2) or equivalent quality line pipes.

b) The Manufacturer should have manufactured and supplied from the proposed pipe mill/(s) at least one (1) km of line pipe in a single order as per API 5L, PSL-2 (or equivalent) that are of same type and equal or higher in terms of diameter, wall thickness and material grade for items I & II in last 7 years from date of submission of documents for approval to IGGL/ MECON.

c) **The Mill Qualification:** The pipe manufacturer shall also furnish a mill capability certificate for proposed pipe mills from a reputed international inspection agency (i.e., CEIL/ Lloyds/ BV/ DNV/TUV/ Apave TIV India Private Limited / Moody/ AIB-Vincotte), certifying that the mill has capability to produce line pipes complying with technical requirements specified in the bid documents for same or higher size, wall thickness and material grade as indicated in scope of work.

C Proposed Vendor List for supply of Coated Line Pipe:

1) M/s Welspun Corp., Ltd.
2) M/s Man Industries Ltd.
3) M/s Jindal SAW Ltd.
4) M/s Ratnamani Metals & Tubes Ltd.
5) M/s Arcelor Mittal Nippon Steel (AM/NS) India Ltd

Note: In line with extant policy/Latest Gazette Notification issued by Govt. of India, Bidder shall comply with conditions/provisions as defined in Domestically Manufactured Iron & Steel Policy 2025 against the quoted item. Bidder has to submit all the documents required as per the policy.

Annexure-X
to
Particular Job Specification
(ELIGIBILITY CRITERIA FOR SUPPLY OF MAJOR BOUGHT-OUT ITEMS)

Technical Selection Criteria for Bought Out Item Vendors in IGGL- Duliajan Feeder Lines

For procuring bought out items - i.e., Valves (Actuated / Manual Ball Valves, Plug Valves, Check Valves, Globe Valves), Flow Tee, Insulating Joint, Scrapper Trap, Flanges, Fittings - may be acceptable subject to the following: -

Criterion I) The vendor/supplier of item(s) is a manufacturer of said item(s).

Criterion II) The vendor/ supplier is not in the Holiday list of CLIENT/MECON/OTHER PSU.

Criterion III) The vendor/ supplier should have designed, manufactured, tested and supplied from the proposed manufacturing plant at least 50% of required quantities specified in SOR or minimum 1 number whichever is higher of specifications (same or higher – as per under mentioned Notes) of respective item(s).

Notes:

i. The Criteria mentioned above are SOR itemwise .

ii. Specifications applicable for Valves (Ball Valves, Plug Valves, Check Valves, Globe Valves), Flow Tee, Insulating Joint, Scrapper Trap (PIG Launcher / Receiver), Flanges (including Blind flanges / Spectacle Blinds / Spacer & Blinds), Fittings (Elbow, Reducer) are Size & Pressure Rating.

iii. Specifications applicable for Fittings (Weldolets, Sockolets, Socket Welded Tees, Butt Welded Tees) are Size (Branch size for Weldolets / Sockolets and Run Size for Tees) and Material Specification.

iv. Against Criterion III Manufacturer shall establish through documentations listed in table below for manufacture & supply of 50% quantity or higher of the item(s) proposed to be purchased by contractor in any continuous 12 months period in past 7 years from bid due date.

v. In case of multiple items of same type are ordered on single vendor/ supplier, quantity consideration under Criterion III shall be on cumulative basis.

vi. In case of actuated valves, Valve manufacturer shall be the single point responsibility supplier for complete actuated valve assembly. However, requirement of Criterion III above shall be individually applicable for valve and actuator manufacturer.

vii. In case of Ball Valves and Plug Valves, manufacturer shall submit qualifying valid FIRE SAFE certificate as per API 6FA / API 607 .

Criterion no.	Documents Required
I	**Ball / Plug / Check Valves:** Copy of valid API 6D License. If the license is pending for renewal with API, manufacturer shall submit copy of valid license extension letter from API along with expired license.
	Globe Valves, Flow Tee, Insulating Joint, Scrapper Trap, Flanges, Fittings: Copy of valid ISO/ NSIC/ MSME/Factory Registration Certificate or any other relevant document to establish that bidder is a manufacturer of said item(s).
II	Self-declaration by manufacturer's authorized personal on their Letter Head declaring that they are not in the Holiday list of CLIENT/MECON/OTHER PSU, with date duly signed and stamped.
III	**Valves (Ball Valves, Plug Valves, Check Valves, Globe Valves), Flow Tee, Insulating Joint, Scrapper Trap, Flanges, Fittings:** Copies of Purchase Order (P.O.) / Work Order (WO) and corresponding Inspection Release Note/ Dispatch Clearance Certificate/ Order completion certificate etc. of relevant previous supplies (having cross reference to P.O.) or any other relevant document deemed necessary by the manufacturer to establish their qualification.
	Actuator: List of offered model(s) and make(s) of actuators for quoted valves along with P.O. & Inspection Release Note/ Dispatch Clearance Certificate/ Factory Acceptance Test report/ Completion Certificate (having cross reference to P.O.) for offered model(s) & Make(s) or any other relevant document deemed necessary by manufacturer to establish their qualification. Document submitted for qualification should clearly specify the actuation medium as natural gas.

SECTION VII

SCHEDULE OF RATES / BOQ

Attached Separately