



INDRADHANUSH GAS GRID LIMITED

(Joint Venture of IOCL, ONGC, GAIL, OIL and NRL)

GUWAHATI, ASSAM

BID

DOCUMENT

FOR

**TELECOMMUNICATION SYSTEM FOR PIPELINE
SECTIONS (10 & 11) UNDER NORTH EAST GAS GRID
PIPELINE PROJECT OF M/s IGGL**

OPEN DOMESTIC COMPETITIVE BIDDING

Tender No.: C221052-VCS-IGGL-TENDER-008

VOLUME- II OF II



ENERGISING QUALITY

PREPARED AND ISSUED BY

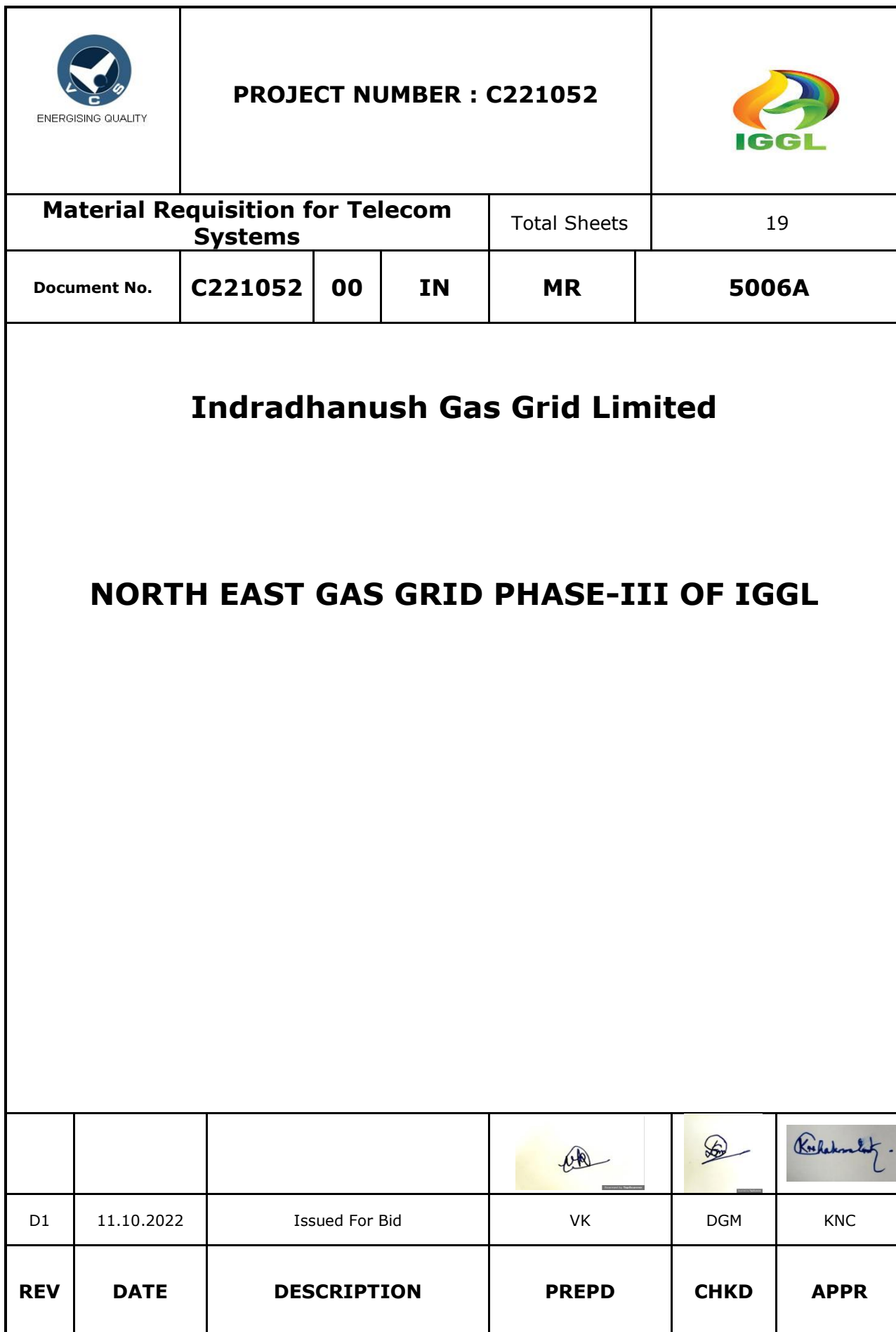
VCS Quality Services Private Ltd.

Noida, India

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Material Requisition of Telecom System



ABBREVIATION

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
BS	British Standards
I/O	Input / Output
IP	Ingress Protection
PIDS	Pipeline Intrusion Detection System
LCP	Local Control Panel
PLDS	Pipeline Leak Detection System
OFC	Optical Fiber Cable
PAS	Pipeline Application Software
PIDS	Pipeline Intrusion Detection System
PLC	Programmable Logic Controller
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SCS	Safety Control System
SIL	Safety Integrity Level
SV	Sectionalizing Valve
UCSPL	Uran Chakan Shikrapur Pipeline
UPS	Uninterruptible Power Supply
XLPE	Cross Linked Polyethylene

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1. DEFINITION

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order

PROJECT	North East Gas Grid Phase-III of IGGL
CLIENT/OWNER	Indradhanush Gas Grid Limited
EPMC	VCS Quality Services Private Limited (VCS) the party to act for and on behalf of OWNER for the Detailed Engineering Services and Project Management.
VENDOR/ MANUFACTURER	Party, which manufactures and supplies equipment and services to the OWNER or to CONTRACTOR

2. INTRODUCTION

VCS Quality Services Pvt. Ltd. (VCS) has been appointed as a PMC (Project Management Consultant) by IGGL for **"PMC Services for North East Gas Grid Phase-III of IGGL."**

Indradhanush Gas Grid Limited (IGGL), a joint venture (JV) of IOCL, ONGC, GAIL, OIL and NRL has been entrusted with the responsibility to execute cross country natural gas pipeline connecting all states of the North East and Sikkim. The natural gas pipeline grid in North East would connect Guwahati to capital cities / major cities of North East states like Itanagar, Dimapur, Kohima, Imphal, Aizawl, Agartala, Shillong, Silchar, Gangtok and Numaligarh. The grid would be connected with upcoming Barauni-Guwahati natural gas pipeline as a part of Urja- Ganga scheme. The grid would also connect to sustainable and viable indigenous gas sources in North-East.

The pipeline grid has been designed with flexibility for gas injection in either direction.

2.1 Project Brief


Salient details of tentative pipeline details under VCS scope of work in the route segment are as under:

A) Siliguri – Gangtok Pipeline (Dia 12") – Tentative length is 186 Kms.

The pipeline in this section originates from a tap off point on Barauni-Guwahati pipeline at Siliguri and traverses through plain agricultural land and forest land for initial 50 odd kilometers which includes the crossing of Teesta River. Thereafter, the pipeline traverses through hilly terrain along the new highway under construction up to Lava, which is approximately at Ch.108.000 km of this pipeline section and thereafter follows the route of NH-717A up to near Ranipool area. The total area traversed by this pipeline section thus comes out to be approximately 186 km.

B) Dimapur – Kohima- Imphal Pipeline (Dia 12") – Tentative length is 199.007 Kms

The proposed pipeline route traverses through plain agricultural land and forest land for initial 5 odd kilometers and then enters the ghats/hilly terrain and

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traverses through it till Senapati town which is approximately at Ch.155.000 km of this pipeline section (en route taking the under-construction Kohima Bypass Road) and then runs through more or less plain area till Sekmai. The total area traversed by this pipeline section thus comes out to be approximately 199 km.

Summary of various stations envisaged in the proposed Phase-III of Gas Grid Development of Natural Gas Pipeline in North-East are as under:

A) SILIGURI – GANGTOK PIPELINE (SGPL)

Sr. No	Type of Station	Nos.	Location
1	Dispatch Terminal-1 (DT-1)	1	Siliguri
2	Intermediate Pigging Station (IP/SGPL/01)	1	Tentatively at Lava
3	Receipt Terminal-1 (RT-1) with/ without Tap off	1	Gangtok
4	Sectionalizing Valves (SV) with/without Tap off in Line-1	8	Along the Siliguri-Gangtok route

B) DIMAPUR – KOHIMA- IMPHAL PIPELINE (DIPL)


Sr. No	Type of Station	Nos.	Location
1	Dispatch Terminal-2 (DT-2)	1	Dimapur
2	Intermediate Pigging Station-2 (IP-1)	1	Tentatively at Tadubi
3	Receipt Terminal (RT-2) with/ without Tap off	1	Imphal
4	Sectionalizing Valves (SV) with/without Tap off in Line-2	10	Along the Dimapur-Kohima-Imphal route

2.2 Purpose

The purpose of this document is to define the minimum technical requirements and Seller's scope of work / supply of Telecom and Pipeline Intrusion Detection System Interfacing Cabinet to be purchased for this project.

3. DOCUMENT PRECEDENCE

It shall be the responsibility of the Manufacturer / Vendor to inform the Purchaser of any errors, ambiguities, inconsistencies, discrepancies or conflict of information that

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may be found to exist in any document, specification or drawing submitted by the Purchaser.

In case of conflict, the order of precedence shall be as follows:

- Material Requisition for SCADA and Telemetry Interfacing Cabinet;
- Scope of Work & Supply;
- System Architecture & IO List
- Standard Specifications;
- Other Documents & Drawings;
- International & National Codes & Standards;


As a general rule in the event of any discrepancy between technical matter and local laws / regulations (and documents above listed) the most stringent shall be applied.

Manufacturer / Vendor shall notify Purchaser of any apparent conflicts between MR, specifications, related datasheets, any code and standards and any other specifications noted herein. (Resolution and/ or interpretation precedence shall be obtained from Purchaser in writing before proceeding with the design/ manufacturer or completion of services.)


4. SCOPE OF SUPPLY, INSTALLATION, TESTING AND COMMISSIONING

Vendor shall be completely responsible to supply, Installation, Testing and commissioning of below mentioned materials and services for satisfying the functional / operational requirements stated in this Requisition and its Attachments. (Herein after referred as Requisition)


Item No.	DESCRIPTION	UNIT	West Bengal	Sik kim	Nagaland	Manipur	Total Quantity
	Project Management, System Design, Detail Engineering, Supply of Materials, Inspection & Factory Acceptance Testing (Equipment & Integrated with subsystem, Packaging, forwarding, Insurance, Transit Insurance, Shipping, Port Handling, Custom Clearance, Inland Transportation to store, Supply of all related erection goods including Mandatory spares, Commissioning spares, power supply, surge protection device, Loading, Unloading & Handling, Storage & Safe custody, Transportation from store to site , Supply of all type of Erection Items, Erection, erection of foundation support channel in trench for						

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	panel erection, Pre-commissioning activity, Testing, Trial Run, Commissioning, Training, Warranty, Extended warranty, Post Warranty Maintenance Contract – comprehensive for 3 years for all supplied equipment, Including minor Civil works, Documentation of MPLS-TP based Digital Fibre Optic Communication System covering CCTV system, Leased Lines, Complete in all respect and shall be executed as Turnkey individual work contract basis as per Job Specification No. : C221052-00-IN-MR-5006B and Standard Specification No : C221052-00-IN-SS-5009						
T.S	Supply Items : Supply with all works as defined above -						
T.S.1	OFC based MPLS-TP (10 G) equipments along with fully wired Rack as per Detailed Scope of Work and Standard specification (C221052-00-IN-SS-5009) (including 1 No. Spare Quantity in each state)	Sets	09	04	07	07	27
T.S .2	Secondary Reference Clock (SRC) (non- Redundant GPS) with antenna & necessary cables suitable for MPLS-TP network, along with all accessories as per Scope of Work (C221052-00-IN-MR-5006B) and Standard Specification (C221052-00-IN-SS-5009).	Sets	01	01	01	01	04
T.S.3	Local Craft Terminal with required software for Optical system MPLS-TP, CCTV as per specifications as per Scope of Work (C221052-00-IN-MR-5006B) and Standard Specification (C221052-00-IN-SS-5009).	Sets	01	01	01	01	04
	Telephones (IP Based) -						
T.S.4	IP telephones with required hardware, cabling / accessories as per Job Specification C221052-00-IN-MR-5006B & C221052-00-IN-SS-5009.	Sets	20	08	18	15	61
T.S.5	Explosion Proof IP Telephones inside Acoustic Booth (including Explosion Proof howler & Explosion Proof flashing beacon) with required hardware, cabling / accessories as per Job	Sets	04	02	04	02	12

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	Specification C221052-00-IN-MR-5006B & C221052-00-IN-SS-5009. The scope also includes supply of acoustic booth with all accessories as per C221052-00-IN-MR-5006 and C221052-00-IN-SS-5009.						
	CCTV Systems and Cameras –						
T.S.6	CCTV System client work stations including necessary hardware and software, accessories as required for Telecommunication System complete as per Scope of Work (C221052-00-IN-MR-5006) and Standard Specification (C221052-00-IN-SS-5009)	Sets	01	01	00	01	03
T.S.7	PTZ Camera with IR Illuminator with housing accessories, Mounting Arrangements, Ethernet switches, Converter, Gateways and necessary accessories as per Job Specification (C221052-00-IN-MR-5006B)& Standard Specification (C221052-00-IN-SS-5009).	Sets	11	05	10	08	34
T.S.8	Fixed Camera with IR illuminator with housing accessories, Mounting Arrangements, Ethernet switches, Converter, Gateways and necessary accessories as per Job Specification C221052-00-IN-MR-5006B & Standard Specifications C221052-00-IN-SS-5009..	Sets	12	06	11	09	38
T.S.9	Test Instruments as per the specifications and as listed below : a) OTDR Meter : 01 No. b) Laser Source : 01 No. c) Power Meter : 01 No. d) Ethernet Tester : 01 No. e) 24 Port Switch (Managed): 01 No. f) 8 Port switch (Managed) : 01 No. g) MPLS-TP Analyser : 01 No. h) Digital Multimeter : 01 No. i) Industrial standard Tool Kit for Telecom : 01 Set of tools with leather bag.	Sets	01	01	01	01	04
T.S.10	Mandatory Spares for all supplied equipments such as MPLS TP- 10G, CCTV Cameras (Fixed & PTZ), IP	Lot	01	01	01	01	04

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	phones, Gateways, power supply, Converters, etc (Bill of Material has to be provided along with offer, any fraction quantity should be round off to nearest number in higher side). Unit rate for Mandatory spares with cards details, part no., make etc. shall be given separately. <u>(10% Spare or Minimum One shall be calculated based on the total quantities; region / state wise as per the above respective Line items of MPLS- TP,CCTV systems)</u>						
T.S.11	Extended Warranty per month (The Extended Warranty is applicable only if completion of trial run/ acceptance of system by owner / handing over of system is delayed beyond 12 months from Supply (Date of receipt of Last material at site) and the delay is not attributed to contractor). All materials shall be considered to be in the custody of contractor fully insured with applicable conditions of warranty. This Extended warranty (after 12 months from last supply) is used to extend warranty for the delayed period till the start of Main warranty (i.e. 24 months), which is supposed to start on successful completion of trial run/ acceptance of system by owner / handing over of system (refer warranty clause). (Refer Note 6 to MR) (Decision of start date & no of month extension of extended warranty will be as per instruction of client/ EIC)	Months	24	24	24	24	96
T.E	Site Work:- Installation, Integration, Site Testing, Trial Run & Commissioning (including all supply of installation materials, accessories, connectors, Distribution boxes, MDF, cables {co-axial cable, multi- pair armoured & unarmoured telephone cables, Ethernet Cables}, pole {maximum 3-5 mtr} with shades & mounting arrangement for CCTV cameras, civil foundation, Power testing of						

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	already laid 24 F OFC fiber, OFC connectors all work for MPLS-TP system, CCTV system, Leased lines, warranty, etc as per Job Specification PJS & TS.						
T.E.1	All Site work as defined above for respective stations (all Despatch, SV, IP stations and Receiving stations) complete in all respect for MPLS-TP system, IP Telephones, CCTV System with Cameras, Clocks, as per Job Specification PJS & TS(1 No. spare quantity in each state).	Lot	09	04	07	07	27
T.E.2	Leased lines (10 mbps) with end to end solution (Hardware & software as required) complete in all respect for 02 year from the date of acceptance as per Job Specification/ PJS & TS. Lease lines are required for MPLS-TP NMS Networking are as: a) Guwahati to Siliguri (Quantity may vary and will be finalised during detailed engineering; for same location if two leased line required shall be provided from different service provider.)	Lot	01	00	00	00	01
T.E.3	Leased lines (10 mbps) required for SCADA server FEP/ Centralised server telecom connectivity to meet SCADA requirement, Leased lines (4 mbps) with end to end solution (Hardware & software as required) complete in all respect for 02 year from the date of acceptance as per Job Specification / PJS & TS. Lease lines are required between : a) Siliguri to Guwahati b) Gangtok to Guwahati c) Imphal to Guwahati (Quantity may vary and will be finalised during detailed engineering; for same location if two leased line required shall be provided from different service provider.)	Lot	01	01	00	01	03
T.E.4	Rectification and Restoration of damaged Optic Fiber Cable (All works including Identification of	Lot	01	01	01	01	04

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	the fault, Test of the fibre for the smooth operation on wavelength, Power Testing of laid OFC, providing jointing pit, jointing marker, electronic marker & ready for Telecom equipments including all supply as required) as defined in the scope of work. One set shall be defined as all works required for identification, rectification and restoration works for 1 fault in OFC.						
T.E.5	Training for MPLS-TP, CCTV system & GATEWAYS, equipment with respective Test instruments at site with OEM and at OEM works / integration centre as defined in PJS of Tender Document.	Lot	00	01	00	01	02
T.E.6	All-inclusive per month rates for maintaining store at site (State wise / regions wise for the supplied material of respective state / regions) during the extended period as required (Refer Note 7 of MR)	Months	24	24	24	24	96
T.P.W	Post Warranty Maintenance Contract (PWMC) as defined in the Particular Job Specification / Bid Document for complete Telecommunication System for 5 years after completion of main warranty / extended warranty complete in all respects as defined in the Particular Job Specification. Payment will be made on quarterly basis. (Note-8 of MR).	Lot	01	01	01	01	04

NOTES:-

1. Bidder shall quote for all the items. Bid offer will be evaluated package wise. All the items will be considered for evaluation purpose. Completion of total work as a TURNKEY work is Bidder's responsibility.
2. Bidder has to note that the Time schedule shall be as define in the tender; supply and site work shall be executed as per the written intimation from client/PMC.
3. Commissioning spare as required will be part of the offer and shall be available at the time of commissioning.
4. Details of Mandatory spares with part no., make etc. shall be given

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separately with the offer & enclosed with techno-commercial documents.

5. The quantity and location of the stations may change due to any change in site location/ requirements; bidder shall to take prior approval for procurement and erection.
6. The Main warranty is for period of 24 months (two years) from the date of successful completion of trial run / acceptance of the system by the owner. All materials will be considered in custody of contractor with applicable conditions of warranty till handing over of the system to Client.

However; bidder has to quote Extended Warranty per month. The Extended warranty shall be applicable for the complete scope of supply including mandatory spares and Test equipments. The extended warranty per month rate will be used to allow the contractor to provide and intact the main warranty for the delayed commissioning & handing over of system not attributed to contractor, so that the Main warranty (i.e. 24 months) is made available on successful completion of trial run/ acceptance of system by owner / handing over of system.


In case of delayed supply attributable to bidder extended warranty will start after adding delayed period of last supply to completion schedule for which cost of warranty/extended warranty is to be borne by bidder.

The extended warranty of complete supplied Telecommunication system (all MPLS-TP equipment, CCTV cameras, IP Phones, Mandatory spares, Test equipments etc) will start after 44 months from FOA and shall continue till the start of main warranty as defined in completion schedule; payment of extended warranty shall be as per the rates quoted by the bidder.

The Extended warranty rates shall be for the complete scope of supply including mandatory spares and Test equipments.

Payments will be made monthly/quarterly as per SOR rate quoted by the bidder and will continue till hand over of the system. The Extended warranty rates shall be for complete scope of supply including mandatory spares and Test equipment and to be billed as per SOR. Extended warranty will be applicable for 24 months or handing over of the system whichever is earlier. Refer completion schedule.

7. Bidder has to complete the work as per the schedule. Bidder shall maintain store at site for storage of all the supplied materials in each state. Payment for the store shall be claimed by the bidder as per the quoted rates after receipt of material at store, from date of receipt of material at store to the date till which the materials are stored in the store. The store has to be maintained for each state /regions of pipeline and billed as per the requirements. Insurance of all materials in the store is included in scope of the bidder and cost of the same shall be covered in the quoted price. Safety and security of store shall be the responsibility of bidder and is included in scope of the bidder. Bidder shall be responsible for all the supplied material till handing

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over of the material to Client.

8. **Post Warranty Maintenance Contract** (comprehensive) as define in the bid shall be provided by original equipment supplier along with bidder **for 05 years of periods** as defined in the Tender for complete scope of supply. PWMC work will start after completion of Main warranty. At the time of FOA; order for supply and site services shall be placed, however client will placed separate order for Post Warranty Maintenance as per terms & condition of the contract on or before 3 months of completion of main warranty.
9. **Operation & Maintenance OEM suggestive spares** (for 2 years) required after PWMC, each module, with complete list, part no, unit rate shall be provided. The validity of rates shall be upto contractual period including PWMC from date of commissioning / acceptance of complete work **(i.e. 7 year – 2 year warranty + 5 year PWMC)**. Refer PJS for details. These 2 years O&M Spares will not be considered for evaluation purpose. These Spares shall be quoted separately with unit price for each item.

Notes:


Vendor shall have complete responsibility for all the items supplied by him including his sub Vendors if any. The Vendor's scope of work includes, but not limited to:

- Design & Engineering;
- Manufacturing;
- Acceptance Test and Inspection;
- Painting;
- Packing & Forwarding;
- Supply of Spares as specified;
- Documentation;

5. SCOPE OF WORK

Vendor shall have complete responsibility for all the items supplied by him including his sub Vendors if any. The Vendor's scope of work includes, but not limited to:

- Design & Engineering, Manufacturing, Testing, Pre-commissioning & Commissioning as per project requirement;
- Project Management & Control Activities;
- Supply of material defined in Section 5.0;

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- Quality Assurance & Quality Control;
- Packing and Shipment to site;
- Inspection and Testing as per vendor proposed ITP and approved by Owner;
- FAT and SAT activities;
- Engineering Documentation;

Vendor shall stand guarantee for all items supplied by them, including his brought-out items;

5.1 Notes to Vendor

Telecom and its accessories shall be sized as per project requirement;

Vendor shall submit Telecom and its accessories and all other required design documents and drawings for approval. Vendor to proceed further only upon approval of Vendor submitted documents.

Vendor Proposed Telecom should be compatible to existing Telecom System for North East Gas Grid of IGGL Phase-III of IGGL.

Vendor shall submit FAT and SAT procedures of Telecom system for review and approval. Vendor to proceed further only upon approval of Vendor submitted documents.

Vendor shall quote separately spares for 2-year normal operation. List of spares quoted shall be furnished.


Vendor to include the startup and commissioning spares in the quoted price. However, list of spares (start up and commissioning) to be made available without prices as per attached formats. In case no startup /commissioning spares are recommended by the Vendor but the same are required at the time of startup /commissioning, Vendor shall supply such spares free of cost.

Delivery of Telecom and its accessories shall be at all the DT, RT, IP & SV Stations in the North East Gas Grid Phase-III of IGGL shall be in the Vendor's scope.

Vendor shall furnish quotation only in case he can supply material strictly as per this MR and specification / IO list forming part of MR.

The submission of prices by the Vendor shall be construed to mean that he has confirmed compliance with all technical specifications of the corresponding item(s).

If the offer contains any technical deviations or clarifications or stipulates any technical specifications (even if in line with MR requirements) and does not include complete scope and technical / performance data required to be submitted with the offer, the offer shall be liable for rejection.

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Vendor must submit all documents / drawings / calculations as specified in relevant specification along with his offer and after award of order.

Works prior to Purchaser's inspector reserves the right to perform stage wise inspection and witness tests, as indicated in Specification for RTUC at Manufacturer's shipment. Manufacturer shall give reasonable notice of time and shall provide without charge reasonable access and facilities require for inspection to the Purchaser's inspector. Inspection and tests performed / witnessed by Purchaser's inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and test.

6. WARRANTY

The Vendor will warrant the equipment to be free of defects in material and workmanship and that it is adequately engineered to fulfill the design and operating conditions specified herein. The Vendor shall replace and install without cost to Company (M/s.IGGL) any materials, supplies or equipment that fails under design conditions due to defects in design, material, or workmanship. If a defect is observed and/or such failure occurs within one (1) year from the date such equipment is put into operation, the Vendor shall replace and install without cost to company (M/s.IGGL) any materials, supplies or equipment involved.

Vendor shall provide another twelve (12) months warranty period for any repair or replacement in whole or in part made during the warranty period beginning on the day of satisfactory restoration of services. If the repair or replacement during the warranty period concerns an essential component, the new warranty shall extend to the whole equipment.

7. VENDOR DOCUMENTS


This section describes the Vendor Data Requirements applicable to a Vendor's scope. The Vendor data requirements shall be as mentioned in the table below.

Vendor shall submit, as a condition of Purchase Order or Contract, all data requirements specified on the Vendor Data Requirements. Electronic copies of all drawings will be provided on CD in DWG format for all drawing issues.

Each document submitted for review must be clear, legible, complete and properly identified. Failure to provide adequate documents may result in them being returned without review at Vendor's expense. In that event, Vendor will be considered not to have formerly submitted the documents so returned.

Vendor shall submit accurate, properly checked documents approved by the responsible Engineer(s). The documents shall be in English language. Dimensions, weights, and measures for drawings, etc. to be in SI units

Vendor shall submit Manufacturers Record Books with all certification, test and inspection information of a manufactured item.

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Additionally, Vendor shall provide Vendor Data Books consisting of all pertinent Manufacturer's technical data and information relating to all the various elements of the units supplied by the Vendor. The data and information shall pertain to the facilities as a whole, to each major system, to each subsystem and every component. The Data Books shall commence with copy of the Purchase Order (pricing information may be blanked out) followed by the manufacturer's equipment brochures, data sheets, certificates, parts list and relevant "As Built" drawings.

Sl. No.	Documents and Data	Along with Quotes	Certified information required after Purchase Order			
			Soft Copy	Printed Matter	Date needed from FOI	Date Promised
1	Functional design Specification for Telecommunication System and sub system	1	4	4	04 weeks	-
2	Telecom Cabinet Wiring diagram	-	4	4	08 weeks	-
3	Filled-in various Forms (attached with the tender) duly filled and signed by the bidder	1	-	-	-	-
4	Bill of Material (Station wise)	1	4	4	08 weeks	-
5	List of Mandatory Spares	1	4	4	08 weeks	-
6	List of Commissioning Spares	1	4	4	08 weeks	-
7	Control Room Layout for each station	-	4	4	12 weeks	-
8	Equipment Interconnection diagram including details of various interfaces etc.	-	4	4	12 weeks	-
9	Telecom Panel internal Layout including mounting arrangement, interconnection	-	4	4	12 weeks	-
10	Internal layout of Telecommunication cabinets, consoles, desks if required including mounting arrangement, interconnection etc.	-	4	4	12 weeks	-
11	MPLS –TP Equipment Documents	1	4	4	08 weeks	-
12	CCTV System Documents	1	4	4	08 weeks	-
13	Standard Telecommunication Equipment Manual for operation & maintenance	-	4	4	-	W/ S
14	User guides, maintenance & configuration manuals for all supplied equipments / subsystems	-	4	4	-	W/ S

15	Quality Assurance Plan	-	4	4	04 weeks	-
16	FAT Procedure	-	4	4	12 weeks	-
17	SAT Procedure	-	4	4	12 weeks	-
18	Test Run Procedure	-	4	4	12 weeks	-
19	IP address & protocol structure at each station	-	4	4	12 weeks	-
20	Datasheet of Sub system	-	4	4	12 weeks	-
21	Channeling Plan & Link Engineering	-	4	4	12 weeks	-
22	Optical Budget System Engineering	-	4	4	12 weeks	-
23	Station wise power consumption calculations of Telecom Eqpt & Sub - System for all stations	-	4	4	12 weeks	-
24	Earthing arrangements	-	4	4	12 weeks	-
25	Necessary Exp. Proof certificate as applicable	-	4	4	12 weeks	-
26	List of spares for O&M for main & sub system	-	4	4	12 weeks	-
27	List of special Tools & Tackles	1	4	4	12 weeks	-
28	Project execution schedule	-	4	4	02 weeks	-
29	Unpriced order copies of bought out items and FDS	-	4	4	04 weeks	-
30	Leased line confirmation from service provider with installation details	-	4	4	12 weeks	-

7.1 Vendor Drawing Review

Drawings returned to Vendor for correction after markup by Company and / or Company designated representative shall be resubmitted by Vendor until "Proceed with Fabrication Issue Final Drawings". All revisions to documents must be clouded and identified with the revision number contained within a triangle placed beside the cloud.

Vendor shall not proceed with changes having a commercial impact unless authorized by Change Order.

If, for any reason, Vendor believes that he is not able to comply with Purchaser and / or Purchaser's designated representative marked-up comments on documents returned after review, Vendor shall notify, in writing, Purchaser within five (5) working

days of receipt, giving his reasons and requesting a resolution. It is not acceptable to ignore marked-up comments.

Vendor must submit updated documents and drawings one (1) weeks after return of approved documents.

Drawings and data approval do not relieve Vendor of his responsibility to meet Purchase Order or contract conditions relating to specifications, material design or construction, and delivery requirements, nor relieve Vendor of responsibility for compliance with laws, codes and regulations.

8. PACKAGE AND STORAGE

Preparation for shipment shall be in accordance with the Vendor's standards and as noted herein. Vendor shall be solely responsible for the adequacy of the preparation for shipment provisions with respect to materials and application, and to provide equipment at the destination in ex-works condition when handled by commercial carriers.

Adequate protection shall be provided to prevent mechanical damage and atmospheric corrosion in transit and at the jobsite.


Preparation for shipment and packing will be subject to inspection and rejection by Company's / Contractor's inspectors. All costs occasioned by such rejection shall be to the account of the Vendor.

Equipment shall be packed, securely anchored, and skid mounted when required. Bracing, supports, and rigging connections shall be provided to prevent damage during transit, lifting, or unloading.

Separate, loose, and spare parts shall be completely boxed. Pieces of equipment and spare parts shall be identified by item number and service and marked with Contractor's order number, tag number, and weight, both inside and outside of each individual package or container. A bill of material shall be enclosed in each package or container of parts.

One complete set of the installation, operation, and maintenance instructions shall be packed in the boxes or crates with equipment. This is in addition to the number called for in the Purchase Order.

Equipment and materials shall be protected to withstand ocean transit and extended period of storage at the jobsite for a minimum period of 18 months. Equipment shall be protected to safeguard against all adverse environments, such as: humidity, moisture, rain, dust, dirt, sand, mud, salt air, salt spray, and sea water.

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9. LIST OF ATTACHMENTS

1. Scope Of work Telecom System;
2. Datasheets & Specification for Telecom System;
3. ITP for Telecom System;
4. Technical Specifications for Telecom System;
5. Pipeline Schematic;
6. Checklist – Technical

10. BID DOCUMENTS

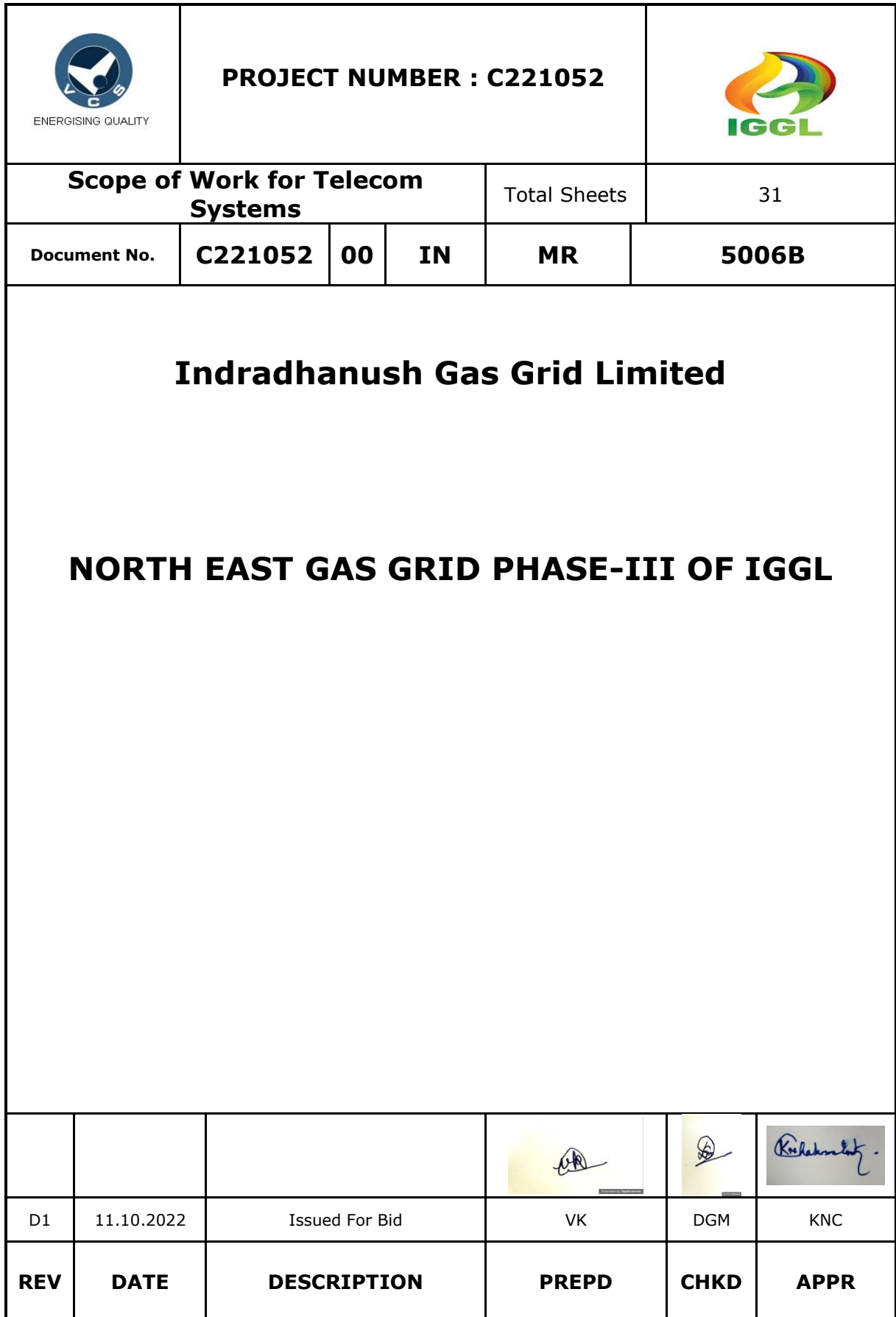
The Following documents are to be provided along with the bid:

1. SOR form duly filled and signed by the bidder
2. Bill of Material (BOM)
3. List of Mandatory Spares
4. List erection & commissioning spares
5. System Architecture Diagram
6. Technical Catalogues of various items of the offered Telecom System like hardware, modules, etc.,
7. Power consumption calculations;
8. ITP of Telecom System;

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Particular Job Specification of Telecom System

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1.0 DEFINITION

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order:

PROJECT	PMC Services for North East Gas Grid Phase-III OF IGGL.
OWNER	Indradhanush Gas Grid Limited
CONSULTANT	VCS Quality Services Private Limited (VCSQSPL) the party to act for and on behalf of the OWNER for the Engineering Services
VENDOR / MANUFACTURER	Party, which manufactures and supplies equipment and services to the OWNER or to CONTRACTOR.

2.0 INTRODUCTION

VCS Quality Services Pvt. Ltd. (VCS) has been appointed as a PMC (Project Management Consultant) by IGGL for **"PMC Services for North East Gas Grid Phase-III of IGGL."** Indradhanush Gas Grid Limited (IGGL), a joint venture (JV) of IOCL, ONGC, GAIL, OIL and NRL has been entrusted with the responsibility to execute cross country natural gas pipeline connecting all states of the North East and Sikkim. The natural gas pipeline grid in North East would connect Guwahati to capital cities / major cities of North East states like Itanagar, Dimapur, Kohima, Imphal, Aizawl, Agartala, Shillong, Silchar, Gangtok and Numaligarh. The grid would be connected with upcoming Barauni-Guwahati natural gas pipeline as a part of Urja- Ganga scheme. The grid would also connect to sustainable and viable indigenous gas sources in North-East.

The pipeline grid has been designed with flexibility for gas injection in either direction.

2.1 PROJECT DESCRIPTION

Salient details of the tentative pipeline sections under VCS's scope of work are as under:

A) Siliguri – Gangtok Pipeline (dia. 12") – tentative length is 186 Kms.

The pipeline in this section originates from a tap off point on Barauni-Guwahati pipeline at Siliguri and traverses through plain agricultural land and forest land for initial 50 odd kilometers which includes the crossing of Teesta River. Thereafter, the pipeline traverses through hilly terrain along the new highway under construction up to Lava, which is approximately at Ch.108.000 km of this pipeline section and thereafter follows the route of NH-717A up to near Ranipool area. The total area traversed by this pipeline section thus comes out to be approximately 186 km.

B) Dimapur – Kohima-Imphal Pipeline (dia. 12") – tentative length is 199 Kms

The proposed pipeline route traverses through plain agricultural land and forest land for initial 5 odd kilometers and then enters the ghats/hilly terrain and traverses through it till Senapati town which is approximately at Ch.155.000 km of this pipeline section (en route taking the under-construction Kohima Bypass Road) and then runs

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through more or less plain area till Sekmai. The total area traversed by this pipeline section thus comes out to be approximately 199 km.

Summary of various stations envisaged in the proposed North East Gas Grid Phase-III of IGGL are as under:

A) SILIGURI – GANGTOK PIPELINE (SGPL)

Sr. No	Type of Station	Nos.	Location
1	Dispatch Terminal (DT / SGPL)	1	Siliguri
2	Intermediate Pigging Station (IP/SGPL/01)	1	Tentatively at Lava
3	Receipt Terminal (RT/SGPL) with/without Tap off	1	Gangtok
4	Sectionalizing Valves (SV/SGPL/01 to SV/SGPL/08) with/without Tap off	8	Along the Siliguri-Gangtok route

B) DIMAPUR – KOHIMA- IMPHAL PIPELINE (DIPL)

Sr. No	Type of Station	Nos.	Location
1	Dispatch Terminal (DT/DIPL)	1	Dimapur
2	Intermediate Pigging Station (IP/DIPL/01))	1	Tentatively at Tadubi
3	Receipt Terminal (RT/DIPL) with/without Tap off	1	Imphal
4	Sectionalizing Valves (SV/DIPL/01 to SV/DIPL/10) with/without Tap off	10	Along the Dimapur-Kohima-Imphal route

2.2 Abbreviations

LAN	Local Area Network
OFC	Optical Fiber Cable
MPLS-TP	Multi Protocol Level Switch
PG	Pressure Gauge
PSV	Pressure Safety Valve
TRV	Temperature Relief Valve
GDS	Gas Detection System
MR	Material Requisition
FACP	Fire Alarm Control Panel
CRV	Creep Relief Valve
MCT	Multi Cable Transit

3.0 DOCUMENT PRECEDENCE

It shall be the responsibility of the Manufacturer / Vendor to inform the Purchaser of any errors, ambiguities, inconsistencies, discrepancies or conflict of information that may be found to exist in any document, specification or drawing submitted by the Purchaser. In case of conflict, the order of precedence shall be as follows:

- Material requisition (MR);
- Data sheets;
- Scope of Work & Supply;
- Standard Specifications;
- Other Documents & Drawings;
- International & National Codes & Standards;

As a general rule in the event of any discrepancy between technical matter and local laws / regulations (and documents above listed) the most stringent shall be applied. Manufacturer / Vendor shall notify Purchaser of any apparent conflicts between MR, specifications, related datasheets, any code and standards and any other specifications noted herein. (Resolution and/ or interpretation precedence shall be obtained from Purchaser in writing before proceeding with the design/ manufacturer or completion of services.)

4.0 INSTRUMENTATION & CONTROLS SCOPE

4.1 Brief Scope of Work

The Vendor's responsibility for completion of the Telecommunication system defined in this document shall be on turnkey basis.

Project Management, System Design, Detail Engineering, Supply of Materials, Inspection & Factory Acceptance Testing (Equipment & Integrated with sub-system, Packaging, forwarding, Insurance, Transit Insurance, Shipping, Port Handling, Custom Clearance, Inland Transportation to store, Supply of all related erection goods including Mandatory spares, Commissioning spares, power supply, surge protection device, Loading, Unloading & Handling, Storage & Safe custody, Transportation from store to site , Supply of all type of Erection Items, Erection, erection of foundation support channel on trench for panel erection, Pre- commissioning activity, Testing, Trial Run, Commissioning, Training, Warranty, Extended warranty, Post Warranty Maintenance contract – comprehensive for 5 years for all supplied equipment, Including minor civil works, documentation of MPLS –TP based Digital Fibre Optic Communication System covering CCTV system, Leased Lines, Complete in all respect and shall be executed as Turnkey individual work contract basis as per this Job Specification and technical specification TS No : C221052-00-IN-SS-5009 .

The proposed Telecommunication system shall comprise of MPLS –TP, Telephones and accessories, CCTV systems with Cameras (PTZ & Fixed); dedicated leased lines from other service provider. As per requirements, the following has been proposed for NEGG pipelines.

- OFC based 10G MPLS –TP optical fiber based telecommunication system

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- IP, Exp proof IP phones
- CCTV PTZ & Fixed cameras with CCTV System
- CCTV Client Work Station
- Leased Lines for backup communications.
- a) In case of any ambiguity, decision taken by EIC (Engineer In-charge) of IGGL/ VCS at site shall be final and binding to bidder.
- b) In the event of any conflict between this specification, data sheets, BOQ, related standards, codes etc. after award of contract, stringent among all the data shall be followed without any implication and no extra payment shall be made towards the same.
- c) Each item of electrical equipment (Junction Box, Cable glands, Camera, Phones, Speakers, Handsets, Field stations etc.) installed in an area classified as hazardous with respect to potential gas explosion shall be constructed in accordance with the recommendations of IEC60079 for Zone 1 , Gr IIA/B. Every item of equipment installed in a hazardous area shall carry PESO certification attesting to its suitability for use in that area.
- d) Electrical equipment intended for use in Hazardous Areas shall be PESO certified for the following types of protection as defined in ATEX Directive 95 / IEC 60079:
 - Sparking or potentially sparking apparatus: Ex ia, Ex ib or Ex d
 - Non-sparking apparatus: Ex e, or any of the above
- e) Junction Box installed in the buildings (Indoor Junction Box) shall be weather proof (IP 42)
- f) The bidder shall carry out site visit to existing IGGL locations prior to submitting the bid to gather all the data required by the bidder for execution of the work (as per the tender) and for integration of different systems supplied under this tender with existing Telecom system of IGGL as per the tender requirements. It shall be the responsibility of the bidder to gather all the inputs/ information required for installation, testing and integration purpose. IGGL/ VCS shall not be held responsible for any missing / lack of input/ information. After award of the contract, all the works required, as per the tender, shall be carried out by the bidder at both ends.
- g) All software license shall be perpetual and shall be in name of IGGL. Soft license shall be provided, dongle keys shall not be acceptable.
- h) All the supplied equipment shall be considered for 24*7 operation.
- i) The scope of integration shall include supply and installation of all hardware and software, licenses etc as required for complete and seamless integration of the respective systems.
- j) Any item, which is not in BOM but required for to meet the complete functionality of the system as per the tender , is included in scope of the bidder and should be supplied by Vendor free of cost. The cost of the same shall be included in the quoted prices of the available SOR items.
- k) Based on the availability of site, the TELECOM vendor will be required to conduct multiple site visits to various locations. Since different agencies are executing works simultaneously for completion of Pipeline Project work, all the sites may not be handed over for erection/installation works in one go but may be handed in progressive manner and it may also be possible that single site may be handed over as per project requirement. Similarly, all the

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sites may not be handed over for testing and commissioning works in one go but may be handed in progressive manner and it may also be possible that single site may be handed over as per project requirement. It shall be the responsibility of the TELECOM vendor to conduct site visit to ascertain the readiness of the site & complete installation works. IGGL/VCS shall not be held responsible for any lack of input. Based on the availability of site, TELECOM vendor shall mobilize and de-mobilize the site team multiple times to complete the work. The cost for the same shall be included in the quoted prices of available SOR line item.

- l) All underground cables shall be laid in trench prepared by the bidder as per the specifications provided elsewhere in the tender document. All above ground cable (including cables in control room, field etc) shall be laid on perforated GI cable trays (as per specifications provided elsewhere in the tender document).
- m) Bidder to mount the panel on trench on an insulator (to be supplied by Bidder) so that contact between panel and trench can be avoided. Insulator to be able to bear the weight of the panel. Additionally Surge Protection Device (SPD) for incoming DC Power shall be kept for telecom panel protection.
- n) Positive isolation for incomer power supply shall be provided by the bidder and is included in scope of the bidder. Necessary power supply converters required for positive isolation is included in scope of the bidder. Redundant power supply converter with MOSFET module shall be provided for positive isolation.
- o) Isolator between Telecom panel and cable trench channel should be provided.
- p) Power cable of 10sqmm shall be provided for connecting Telecom Panel with 48V DC power supply.
- q) All the Servers, Clients (CCTV) to be provided with licensed antivirus valid till 4 years
- r) Explosion phone should have FRPVC/ FRLS armoured cable from control Room

4.2 Detailed Scope of Work

The proposed Telecommunication system / Network for pipeline of IGGL shall comprise of the following, for the Standard Specification refer SS No : C221052-00-IN-SS-5009 enclosed separately.

- OFC based MPLS –TP Telecom system , MPLS –TP (10G) where MPLS –TP (10G) shall form the backbone, equipment fully wired with Rack, compatible to operate with ITU-T G-652D, configured and equipped with all specified interfaces, VoIP phones & handset and capable of supporting specified interfaces with clocks, complete as per specifications.
The rack shall be electrically isolated from base frame/ trench. Bidder shall provide suitable electrical insulator between the rack and base frame or rack and trench so that contact between rack and base frame/ trench can be avoided. Insulator (to be supplied by vendor) shall be able to bear the weight of the panel. The ring based dual Optical Fibre Pairs shall be created to connect stations on pipelines. The ring is based on sequential network topology with a redundant path. The proposed system shall use the

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latest technological advancements in MPLS –TP networks. All IP based equipments shall comply with IPV6 in addition to IPV4 and MPLS-TP Compliances. Telecom vendor shall provide necessary patch cords (10 Meter) conforming to G.652D standards for interconnecting systems with back bone fibre optic cable.

The optical transmission shall provide a transparent transport for voice, data and video services. This will form a reliable and redundant high-speed medium with switch over capability (<50 ms) in the event of fiber break or laser failure.

The equipment configuration of each spare telecom for SV station will be similar to SV type equipment, for each spare DT/ RT equipment, configuration shall be similar to DT type equipment of highest configuration.

The tier-1 link and tier-2 link stations shall be considered as per following philosophy –

- The maximum distance between stations for The Tier-1 link shall be 65 Kms. However, all IP, DT, RT stations shall be included in Tier-1 link.
- Tier-2 link shall include all the stations.
- In case distance between two Tier-1 link stations exceeds 65 KM, then Necessary Amplifier, DCM module, as required, shall be provided.

Accordingly, the bidder shall design the telecom network. The Telecom network shall be finalized during detail engineering.

Necessary Amplifier, DCM module, as required, for Tier-1 Link with SFP, attenuators, power supply, patch chords etc. as per site requirement and job specification shall be provided. The alarms from amplifiers, DCM Module etc. shall be extended on MPLS-TP NMS by using external alarm inputs of MPLS-TP equipment.

25% spare Ethernet ports shall be provided after consumption of all the ports for each application.

- GPS (Secondary Reference Clock) (With non-redundant GPS) with antenna & necessary cables, accessories shall be supplied as per specifications. GNSS clock with Redundant Power supply, Minimum 4 Clock output, GNSS antenna, antenna mounting accessories, 50-meter antenna cable, surge arrestor for power and signal, patch cords , other accessories etc as required shall be supplied as per specifications. Bidder to provide Balanced type 120 Ohm connectors with each clock module.
 - Dedicated leased line (quantity as per the MR) for extension / backup of IP EPABX / SCADA / MPLS –TP equipment Management connectivity shall be provided as backup to OFC communication network to ensure that the Voice / data / SCADA / MPLS –TP management.

Total end to end solution for leased lines including procurement, supply, installation, testing, commissioning (Hardware & software as required) etc complete in all respect for 02 year from the date of acceptance. Lease lines are required as define in MR. Leased line shall be provided from two different service providers. Item will be executed only as per site requirement. Bidder to note that Leased line shall be terminated in Telecom panel through Ethernet RJ45 connector. Automatic switchover shall be provided from MPLS-TP equipment to lease line in case of failure of MPLS-TP link. SPD shall be provided for each lease line link connection.

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The leased line shall be of 10 Mbps MPLS based and shall be provided with router and inbuilt firewall as required. Lease line shall be divided for voice and data, preference shall be for data transfer (min 8Mbps). In case of the primary OFC failure, the SCADA system, RTU-LAN, RWS LAN & VoIP LAN shall be operational through leased line. The switching from primary OFC to leased line shall be automatic. Bidder shall consider necessary one-time infrastructure charges and necessary liasioning for leased line.

Necessary router for telecom network connectivity for lease line connection at respective location of lease line locations shall be provided with Ethernet port at both ends of each leased line termination. For lease line connection, router with minimum 4 ports has to be supplied by Telecom vendor. The necessary equipment to be supplied by Telecom vendor shall have **02 Nos Ethernet port as spare (finalized during detailed engineering)** after required ports considered for total connectivity.

Bidder shall be one point contact for all works including installation, testing, maintenance (limited to interfacing of leased network), etc for the above leased line till the end of warranty period for the complete telecom system.


All necessary arrangement & formalities, (including all communication with the service provider, etc) to provide the end solution shall be Bidders responsibility. The maintenance of lease line will be the responsibility of service provider initially for 2 years and then till the renewal of lease line contract. The start date will be considered from the date of establishing of the link between the respective stations. The system will be considered accepted only when "Pinging" from both end shall be done successfully through leased line. Owner's responsibility shall be limited to issue of necessary request letters seeking permission, as required.

- Design, Detailed engineering including link budget as per the calculation has to be provided by Telecom vendor. OFC for the pipeline will be laid by other contractor and handed over to telecom vendor in healthy condition after end to end power testing upto FTC end. Telecom vendor has to do splicing and termination of OFC on FTC, Modify (if required) as per Telecom requirement as per the Network philosophy agreed with IGGL/PMC. Telecom vendor shall do power testing end to end of the fibre for the smooth operation on wavelength before taking over OFC for each sections / stations.
- The location may change; bidder shall take prior approval before execution of work. The cabling from the Telecom room to respective room / guard room to extend the telephones shall be done. The phones have to be installed on the desktop at RT / DT location room and at SV/IP location wall mounted on tray with proper dressing on cable tray. The distance between Telecom rooms and guard room will be appx 30 mtr at each location however cabling work has to be done as per site requirement.

All the supplied EPABX shall be integrated with each other such that any phone connected to any EPABX shall call any other phone connected to any other EPABX without any loss of any functionality. Accordingly, the IP licenses in each EPABX shall be provided.

The IP phone shall be provided with following philosophy –

- 1 No IP phone shall be provided at the guard room of each station and it shall

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- be connected to IP- EPABX. The IP phone shall be provided with proper wall mounted tray arrangement for installation of the telephone .
- 1 No. IP phone shall be connected to MPLS-TP equipment for VoIP based calling. The IP phone shall be installed in the control room with proper wall mounted tray arrangement for installation of the telephone. These phones shall be independent of IP-EPABX and can be used for calling even on failure of IP-EPABX.

Each IP phone shall be provided with dual SIP license such that it can be used to call IP phones connected to EPABX and IP phones connected to MPLS-TP equipment (VoIP based). The complete system shall be provided such that the EPABX connected IP phone can be used to call VoIP based IP phone and vice –versa. However, MP2MP Ethernet VoIP services LAN for IP Phones, which can be interfaced with IP EPABX will also be considered.

PoE switches, as required, shall be provided at each station. 25% spare Ethernet ports shall be provided in each Ethernet switch. All the IP phones shall be powered from 10/100/1000 Mbps PoE switch. At all locations, suitable power supply converters/PoE injectors shall be provided. All cables for telephones of suitable length as per site requirement shall be provided by Bidder.

PRI to Ethernet Converter

4 Port PRI to Ethernet converter (TDM Over IP) with power supply, patch cords and mounting accessories, voice mail license, including all hardware and software, accessories and subsystems as per scope and tender requirement shall be provided.

All IP phones shall be PoE based standard IP telephones with all necessary licenses including power supply adaptor, Ethernet Cable & patch cord, mounting kit etc.

CCTV System consisting of Fully Wired server Rack, CCTV client work stations as defined including software and Network Added storage(NAS) minimum 150 TB at each location (or higher suitable for atleast 90 days backup data of all cameras (cameras as per MR + 10+ Mandatory spare+ 25% of (MR + mandatory spare + 10)) and finalized during detail engineering), CCTV client work station shall be provided with 32" screen monitor as defined above & in specifications.

CCTV client work stations shall be provided with 32"screen monitor for view with necessary equipments like Ethernet switches, Converter, Gateways, furniture and necessary accessories complete work as define above & in specifications.

Client Workstation shall be provided for System Administration / Management / Maintenance / Video Analytics etc along-with LED Monitors, Keyboards(wireless), Mouse(wireless), Joystick controllers / Mouse-KeyBoard for PTZ Cameras. CCTV Cameras (PTZ type), CCTV Cameras (Fixed type) shall be FCC or CE and UL or BIS Certified with housing accessories, inbuilt IR, Mounting Arrangements and minimum one each for SVs, IPs, Despatch and Receiving Stations with necessary Converters, gate-ways, power and communication cabling / accessories shall be provided.

Fully wired Server Rack with all hardware and other accessories shall be provided for CCTV NVR Server at each server location.

All the requisite Software required for each NVR Server and Work station supplied by the bidder shall be provided to meet the complete functionality of the system as defined in PJS, Technical Specification, Drawings and other documents provided with the tender.

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One PTZ and one fixed camera shall be installed at each SV locations; Two PTZ and two fixed cameras shall be installed at each IP location. The quantity of CCTV camera at each location shall be as per the list provided in Annexure-XII. In general the PTZ camera shall be installed on the roof top / building external wall with post along with weather proof canopy to cover total area and the process area. In addition, At DT / RT locations, the CCTV camera shall be installed on Pole (3/6/8 mtrs as per site requirement). The fixed camera shall be installed near the guard room to monitor the entry / exit of main gate. Necessary poles for CCTV cameras, as required as per site requirement, shall be provided by the bidder.

10 nos. Explosion proof camera shall be provided at a free issue material to the bidder. All the works (including supply and installation of all required materials) related to installation, cabling, integration, testing and commissioning of the free issue camera with bidder supplied CCTV system shall be the responsibility of the bidder and is included in scope of the bidder. Necessary poles(3/6/8 mtrs as per site requirement) for CCTV cameras, as required as per site requirement, shall be provided by the bidder.

If the cable length of any camera from the Telecom panel in the control room is more than 70 meters, in such case, OFC , LIU, media converters and all other hardware, as required, shall be provided for each of those cameras at each station. All the works related to connection of each of those camera with the telecom panel is included in scope of the bidder.

Layer -3 Switch shall be provided for CCTV system including cameras. PoE switches, as required, shall be provided at each station. All the CCTV Switches shall be provided with layer-3 multicasting including IGMP Snooping and IGMP Querier. 25% spare Ethernet ports shall be provided in each Ethernet switch.

The recording of CCTV cameras shall be stored in each respective CCTV camera as well as CCTV NVR and NAS installed in Master & Emergency control room. For storage at camera level, the camera shall have removable memory card. The capacity of the card shall be designed to store minimum 3 days of data on FIFO manner. This storage shall be synchronised with CCTV NAS.

- Special Tools & Tackles required for the supplied system shall be arranged by the bidder for erection & commissioning.
- Mandatory Spare shall be supplied (for MPLS -TP , CCTV System with cameras, IP Exchange, Gateways, Video conferencing equipment) as minimum requirements as per SOR. (Bill of Material has to be provided along with offer, any fraction quantity should be round off to nearest number in higher side). **Unit rate for Mandatory spares with cards details, part no., make etc shall be given separately with the offer & price part.** Mandatory spare shall be calculated as per the clause define in this PJS.
- Dedicated Cu - Earthing at each station is in scope of bidder and it shall be dedicated for the Telecom system supplied by the bidder. Bidder shall supply and install all the items required for construction of copper earth pits. At Numaligarh, Guwahati and Silchar stations, minimum 2 Nos. Copper earth pits shall be constructed to form a grid. At all other stations, minimum 1 no. earth pit shall be constructed. However, if more number of earth pits are required at any station to meet the requirement of earth resistance, same shall be provided by the bidder without any cost implication to IGGL/ VCS. Earth connection from earth pits to


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respective telecom equipment is also included in scope of the bidder.

- Surge protection for incoming power supply & lightening protection for indoor Telecom equipment shall be in bidder's scope.
- **Sites being remote, Vendor to arrange/hire their own dedicated transport to site as and when required.**
- Integration with the PACS (Public Address and Control System) system and VHF system with bidder supplied EPABX system at Guwahati compressor station of IGGL is included in scope of the bidder. All materials (hardware and software) required at bidder's end for integration purpose shall be provided by the bidder.
- Installation, Integration, Site Testing, Trial Run & Commissioning (including all supply of installation materials, accessories, connectors, Distribution boxes, MDF, cables {FRLS armoured power cables, OFC, co-axial cable, multi-pair armoured & unarmoured telephone cables, armoured Ethernet Cables}, pole { 3/6/8 mtrs as per site requirement} with shades & mounting arrangement for CCTV cameras, civil foundation for pole, Power testing of already laid 24 F OFC fiber, OFC connectors all work for MPLS –TP system, CCTV system, IP EPABX system, Video conferencing equipment & system, Leased lines, warranty, Post warranty Maintenance as per all other items / work not indicated here but required for completion of the system). All the Rack /Panel should have anti- vibration pad, positive isolation from base channel, door switch & light (LED) & Name plate (all both front & back side) and minimum dimension of 2000 H x 800 W x 800 D mm plus 100 mm base channel plus 15 mm anti vibration pad(if required, to be decided during detail engineering). The Server Rack dimension shall be -height must be of 2000 mm plus 100 mm base channel plus 15 mm anti vibration pad, depth shall be 1000 mm, Width Shall be 800 mm.
- Scope of Site Services

In general, the activities given below are in the Vendor's scope at minimum.

- Obtaining relevant permits and approvals for site work.
- Obtaining entry passes and completing all the formalities for Vendor manpower (includes Contractor manpower).
- Distribution of AC/DC power within Vendor racks and consoles etc.
- Powering up of the system to complete commissioning.
- Loading/Checking of system configuration.
- Hardware/software additions / deletions / changes.
- Site Acceptance Test.
- Integration of various sub-systems, third party systems etc.
- Configuration including new channeling plan for main and back-up routes.
- Commissioning of systems and sub-systems.
- Tuning of the system.
- Availability of hardware/software engineers during warranty period.
- Generation of Over, Shortage & Damage (OS&D) reports as required and providing further necessary assistance to the Owner for insurance claims.
- Issue final reconciliation report for all the material used.
- After installation check all drawings for correct installation in accordance with the relevant drawings. Modify the site changes in drawings & bring all drawings to as built level. All changes to be documented and countersigned by the relevant engineer.
- Supply of temporary power during construction and commissioning phase if the Owner's supply is not available.

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o Storage of telecom equipment

The specification covers the minimum requirements for the design, material, manufacturing, inspection, testing, supply, shipment and delivery to site, installation, SAT and trial run of telecommunication systems specified in this document. The description and requirements contained in this specification are concise by necessity and cannot include all details. However, it is the responsibility of the bidder to execute the job on a turnkey basis in accordance with the specifications and internationally recognized good engineering practices for smooth, safe and successful operation of telecommunication system

Design, Engineering, Supply, Installation and Testing of complete cabling system comprising of FRLS Armoured Power Cables, FRPVC Armoured Ethernet cables (minimum CAT 7), Armoured OFC (as required), FRLS Armoured Telephone Cables and FRLS armoured any other cable as required complete in all respect as per the specifications, drawings etc. Armoured Ethernet cables shall be provided for the complete requirement including the cable requirement inside control room. Unarmoured UTP cable shall not be provided and same shall not be acceptable.

- Supply, Installation and Testing of all the erection hardware such as media converters, cable trays, supports, poles, structural steel, LIU etc., any other items required during erection, complete in all respect for the supplied system and as the specifications, drawings etc.
- All necessary works (minimum civil, trenching, backfilling including end to end power testing etc.) for Rectification & Restoration of already laid Optic Fiber Cable during trial run if required. Separate rate shall be quote as per SOR.
- Bidder shall quote for all the items. The offer will be evaluated on package basis. Commissioning spares as required has to be provided; a detail list of the commissioning spares shall be furnished along with the offer.
- Bidder shall provide Channelling plan to include all the requirements of Telecommunication facilities specified in the tender for MPLS -TP, CCTV system & Cameras allocations, IP EPABX & various phones, for SCADA LAN A & LAN B channel including all software and hardware to realise the system in totality.
- Client will provide Power supply as specified for main equipment locations (IP/SV/RT/DT) as specified in respective section, further distribution and protection if any required shall be in the bidder's scope. All equipment shall be protected with all type of voltage fluctuations. Surge protection device for the power and communication shall be considered both internal and external type confirming to IEC or UL standards. Surge Protection devices shall be provided as per following philosophy-
 - For all incomer power supply (UPS as well as Non-UPS)
 - For each camera
 - SPD for each lease line connection with each type of Server (MPLS -TP, EPABX, SCADA)
 - Earthing Circuit for lightning protection
 - SPD for each Explosion proof IP phone

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Surge Protection

All outdoor telecommunications structures shall be protected against lightning. Equipment shall have protection against hazards to personnel safety, system errors and hardware damage resulting from electrical transients, voltage surges and lightning surges on signal and power circuits. Surge Protective Devices (SPD) shall be used for all instances of external telecommunications copper cabling, this is in addition to mandatory earthing and lightning protection system designs. All the indoor and outdoor equipment shall be protected from lightning and voltage surges. All the outdoor power and signal cables shall be provided with surge protection on both field and cabinet side.

- Furniture - CRCA Computer Console (as per the specification), Printer Table (as per the specification) and executive chairs shall be provided - for installation of three major system EPABX, CCTV NVR system, MPLS -TP NMS at all locations. One network printer common for various systems, sub systems, equipment etc shall be supplied.
1 No. CRCA Computer Console shall be provided for each Workstation/ Client (for MPLS -TP, EPABX and CCTV) Supplied by the bidder. 1 Nos. Chairs shall be provided for each Workstation/ Client (for MPLS -TP, EPABX and CCTV) Supplied by the bidder. 1 no. Printer table shall be provided for each printer supplied by the bidder.
- There shall be designated interfaces between telecommunication systems and other discipline systems. The interfaces shall be determined during the detailed design phase of the project. Telecommunication interfaces involving information interchange shall make use of TCP/IP for this purpose, wherever possible.

The scope of job includes excavation in all kinds of soils including hard soils for cable trenches of 800 mm deep & width as per the site requirement, Supply & laying of sand of 150 mm compacted thick in two layers (75 mm below the cable & 75 mm above the cable) as directed at site, Supply & laying of good quality Class-1 red bricks of standard size (min 200 mm length and min crushing strength 35 kg/cm sq) inside the cable trench as directed at site, backfilling the cable trench & providing cable route markers at every 30 m & at all corners as directed at site, etc complete as required for completion of whole job. The complete requirement as contained in the Bid Document shall be executed on turnkey indivisible works contract basis.

- All the power supply to each Telecom Equipment shall be provided with Miniature Circuit Breakers (MCB) of required capacity. Separate Distribution Box shall be provided for AC power and DC power distribution.
- Any item, which is not in BOM but required for to meet the complete functionality of the system as per the tender, is included in scope of the bidder and should be supplied by Vendor free of cost. The cost of the same shall be considered included in the quoted price of the available SOR items.
- Any item, which is not in BOM but required for commissioning/operation of the system, should be supplied by Vendor free of cost. The cost of the same shall be considered included in the quoted price of the available SOR items.
It is not the intent of Purchaser to specify every piece of equipment/item/ work but nevertheless any item / work not specifically mentioned but required as per Good Engineering Practice and for the safe & trouble free operation of the Telecom system deemed to have been specified & shall be in the scope of Bidder without any

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implication in the price or schedule. Any work required necessary to complete the interfacing during engineering / site installation commissioning shall be in bidder's scope. The quantities and the locations are likely to change, and shall be finalised during detailed engineering / execution. Bidder shall take prior approval before procurement or Installation from client / EIC.

5.0 SCOPE OF WORK

5.1 Procurement

Contractor scope of work for Telecom items procurement shall include, but not limited to the following:

- Contractor shall procure and supply all materials other than Company supplied free issue items/ materials, required for permanent installation of I&C items in sequence and at appropriate time. All equipment, materials, components etc. shall be for the intended service, with high reliability and proven track record.
- Contractor shall procure and supply all the Telecom Equipments (MPLS-TP Equipment, CCTV Cameras etc.), erection, commission, cable supply and equipment's of Telecom items at appropriate time.
- Approved Vendor List has been enclosed with the Bid for various items. For items which are not covered in the Vendor List, Contractor shall obtain Company's prior approval for the Vendor. Necessary details i.e. Data Sheets & Specifications for the items in the Contractor's scope of supply shall be provided with the Bid Documents.
- Preparation of Material Requisition (MR), Request for Quotation (RFQ), technical bid evaluation and recommend Vendors for Company's approval. Only single offer shall be provided by the bidder fully complying to specification requirements for Company's review and approval;
- Stores management including receipt, warehousing, preserving the material in good condition, issue of material to construction site, reconciling / handing over surplus material to Company for Company supplied items at Company's storage yard;
- Carryout proper documentation of inspection and quality assurance programs for bulk materials duly approved by Company. Contractor shall maintain an accurate and traceable listing of procurement records for the location, quality and character of all permanent materials in the Project;
- Contractor shall immediately report to the Company of all changes which will affect material quality, and recommend any necessary corrective actions to be taken;

5.2 Construction

Contractor scope of work for Telecom items construction shall include, but not limited to the following:

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- All construction works shall be carried out as per "Approved for Construction" drawings, procedures, specifications and applicable codes and standards. Any changes at site shall need prior approval from the Company followed by subsequent revision of relevant drawings upon approval;
- Construction drawings shall be provided by company to successful EPC contractor;
- Contractor shall do the follow up with the concerned authorities to get the permissions to execute the job in time. However, all statutory payments required for such permissions shall be reimbursed by Company at actuals. Contractor shall obtain permits / clearance from concerned authorities before actual commencement of the job at site including preparation and establishment of safety procedures for pipeline instrumentation job;
- Contractor shall also inform all local authorities in advance and obtain all necessary approvals for works wherever encountered along the system. Contractor shall be required to carry out all the works as mentioned in the work permit;
- In some areas where mechanized excavation is not possible, Contractor shall have to do manual excavation also. Contractor shall consider all these eventualities while bidding;
- Providing schedules, progress reporting, organization chart at construction site, quality assurance plan and developing quality control procedures, as per requirements of the bid package;
- Providing all equipment, manpower, machinery, consumables, apparatus, tools and tackles for fabrication, installation, inspection, testing, pre-commissioning and commissioning complete as required including facilities for inspection and interpretation of testing results by Company's Representative;
- Obtaining all necessary approvals and work permits from Company / Concerned local authorities having jurisdiction including all work permit as applicable for performing the work in existing terminal facilities.
- Coordination and supervising the work of sub-Contractors.
- Transportation of appropriate materials to worksite, intermediate storage points, maintaining and operating an adequate material control procedure at worksite.
- Fabrication of all small piping tubing, structural components as per approved drawings.
- All associated civil, structural, electrical, instrumentation; and telecom works shall be performed in accordance with relevant specifications, drawings and requirements.
- Provide, maintain and operate all temporary facilities required for the construction related works and remove after completion of work.

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- Receiving and taking-over Company supplied free issue items from designated warehouse, loading, transportation, unloading, handling, and stacking of items at Contractor's worksite(s)/ workshop till the materials are installed in permanent installation.
- Mobilizing and providing all equipment's, manpower (skilled and unskilled), consumables and other resources etc. as required for the execution of complete work.
- All the Telecom Items MPLS-TP Equipment, IP EPABX System & CCTV System Shall be connected to the Telecom Panel.

5.3 SPARES:

Supply of Mandatory spares and Commissioning Spares of all supplied equipments shall be provided as per the following:

MANDATORY SPARES

For calculation of mandatory spare, statewide quantity shall be considered and accordingly, state wise mandatory spare shall be provided. 10% or min. one number (Whichever is higher) of modules and equipment (out of the modules / equipment supplied / provided) in the MPLS-TP System, EPABX system and CCTV system shall be supplied as mandatory spares. Module / equipment of each type, for all types of cards / modules used in their system / sub-system including cross connect unit, optical interface card, SFP module, Ethernet interface card, gateways, extension cards, interface cards, various types of cameras with IR lamps, media convertors, power supply convertors, patch connectors, Ethernet managed switches, surge protection devices, etc. shall be supplied as mandatory spare but shall not include hardware like hard disk, disk drives, visual display unit etc. Chargers and any major items of the subsystem shall also be taken into accounting & considered during calculation of mandatory spares The spare shall be provided as part of base quote and shall be supplied as loose items. CCTV cameras full equipment shall be considered as spare, state wise. **In case total installed cards are 1 or 2 then only one spare card shall be provided. Bill of material (with spare calculation) must be furnished along with offer.**

Full equipment shall be considered as spare for the following-

- CCTV cameras of each type
- GPS clock
- Ethernet Switch of each type
- Amplifiers
- Surge Protection Device of each type
- Media convertors
- SFP module of each type
- power supply convertors of each type
- patch connectors
- MCBs

6.0 NOTES TO CONTRACTOR

Contractor shall facilitate activities in supply installation, testing and commissioning of I&C scope of work as detailed below.

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Contractor shall be responsible for complete activities involving all Sub-Contractors including Instrument Sub-Contractor (as applicable) working under him for the complete I&C works as part of his scope.

Scope of work shall be read in conjunction with the Schedule of Rates, design basis, specifications, datasheets, drawings and other documents forming a part of the Contract document. Wherever there is a contradiction between the above, stringent conditions shall take precedence.

Contractor shall quote unit rates for all items covered in the "Schedule of Rates" (SOR). Every month, the Contractor shall submit an account for all the materials issued to him by the Company (as applicable) in the standard Performa prescribed for this purpose by the Engineer-in-Charge.

On completion of the work, the Contractor shall submit 'Material Appropriation' statements for all materials issued by the Company in the Performa prescribed by the Engineer-in-Charge.

Contractor shall be responsible for co-ordination during installation, pre commissioning and commissioning with Mechanical and other Sub-Contractors for proper installation of line mounted instruments such as actuated valves, flow meters and skids as applicable.

Contractor shall be responsible for installation and providing assistance for pre-commissioning and commissioning of all instrumentation items.

The system shall be guaranteed to give specified performance of 99.99% for a period of 24 months (two years) from the date of acceptance of the system by the owner as per the terms & condition of contract. This warranty shall survive inspection of goods and acceptance of the system.

Bidder has to quote Extended Warranty **per month** (along with OEM). The Main warranty is for period of 24 months (two years) from the date of successful completion of trial run / acceptance of the system by the owner. All materials will be considered in custody of contractor with applicable conditions of warranty till successful completion of trial run/ acceptance of system by owner / handing over of the complete system to the Client. After the completion of trial run/ acceptance of system by owner / handing over of the complete system to the Client, Main warranty of the System (for 24 months) shall start.

However; bidder has to quote Extended Warranty per month. The Extended warranty shall be applicable for the complete scope of supply including mandatory spares and Test equipments. The extended warranty per month rate will be used to allow the contractor to provide and intact the main warranty for the delayed commissioning & handing over of system not attributed to contractor, so that the Main warranty (i.e. 24 months) is made available on successful completion of trial run/ acceptance of system by owner / handing over of system.

In case of delayed supply attributable to bidder extended warranty will start after adding delayed period of last supply to completion schedule for which cost of warranty/extended warranty is to be borne by bidder. The extended warranty of complete supplied Telecommunication system (all MPLS-TP equipment, Servers, NMS, CCTV System & cameras, EPABX & IP Phones, Analogue Phones, Mandatory spares, Test equipments etc) will start after 44 months from FOA and shall continue till the start of main warranty as defined in completion schedule; payment of extended

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warranty shall be as per the rates quoted by the bidder.
The Extended warranty rates shall be for the complete scope of supply including mandatory spares and Test equipments.

Payments will be made monthly/quarterly as per SOR rate quoted by the bidder and will continue till hand over of the system. The Extended warranty rates shall be for complete scope of supply including mandatory spares and Test equipment and to be billed as per SOR. Extended warranty will be applicable for 24 months or handing over of the system whichever is earlier. Refer Clause for Warranty in Particular Job specification of the tender

Contractor's engineers/ technicians, capable of trouble shooting & looking after the health of the system during the Warranty period/ Extended warranty, shall be made available all through the period of 24 months.

During the Warranty / Extended Warranty, the vendor shall use his own instrument, spares, man-hour, communication facilities, hardware, software, materials, etc. for the rectification of any problem.

Contractor's engineers and technicians, capable of trouble shooting and looking after health of system during the warranty period, shall be made available all through the period.

Additionally the following shall also apply:

- s) During the warranty, the vendor shall use his own instrument, spares, man-hour, communication facilities, hardware, software, materials, etc. for the rectification of any problem.

One number resident engineer with minimum 2 years experience shall be provided each at each NMS server location during the warranty period.

- b) The "turnaround time" for the rectification of the problem shall be minimum. The owner envisages that the system, due to built in redundancies, shall always be operational. The owner shall be within his powers to impose penalty for complete break in communications system for more than the designed specifications. The same shall be discussed on award of work.
(Turnaround time: From the time of placement of first service call to vendor's representative until the system is restored fully to the satisfaction of the Owner.)

- c) The vendor shall provide trained engineers and technicians on site during warranty maintenance.

- d) The bidder shall be responsible for proper design, quality, workmanship & maintenance of all equipment, accessories etc. supplied by the bidder including all services, spares and consumables for a period of 24 months (warranty period) after taking over the system at site, for meeting the functionality and performance requirements of this contract. To fulfil the same, it shall be obligatory on the part of bidder to modify/upgrade, rectify any hardware problems in the system or replace any hardware from the supplied equipments and modify/upgrade, rectify the operating system software, Equipment software, other software, supply the required spares and consumables and attend to the troubleshooting & maintenance of the complete system, free of cost, during start up and on-line operation &

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maintenance of the system, within the Warranty period. Any modifications/ up gradation or replacement of any hardware & software during warranty shall not affect the performance & functionality of the system. In addition to this bidder will also have to carry out the updation/ change in setting based upon the input received from client or through their own analysis tools. To do corrections/ modifications/ diagnosis from remote, internet connection can be provided by client, if required.

- e) The repair work should not however exceed 7 days otherwise warranty period shall be suitably extended.
- f) After the successful completion of Trial run & successful performance testing, the PRE WARRANTY COMPLETION CERTIFICATE shall be issued by the IGGL/ VCS and there after Warranty phase will start.
- g) As soon as the Warranty phase has been successfully completed and the bidder fulfils his obligation, he shall be eligible to apply for COMPLETION CERTIFICATE. The COMPANY shall issue to bidder the COMPLETION CERTIFICATE after receiving an application from bidder after verifying that works have been completed in accordance with the Contract Document.
- h) The BIDDER shall warrant that the software are in good working order, is free of viruses, operates and performs properly on the hardware and network infrastructure. During the warranty period the BIDDER shall provide the following support for the software at no extra cost to the company.
 - Technical assistance or consultation in order to assist the Company in solving problems encountered in the course of using the software.
 - Timely correction of errors/defects in the software and system documentation.
 - Provision of new releases of the software and/or documentation which incorporate solutions to all errors and/ or defects encountered in the use of the software or improvements to the software introduced by the BIDDER.
 - Any additional support normally provided by the BIDDER to his customers during a warranty period.
- i) Penalty Clause –
 - Bidder to note that in case bidder fails to replace the faulty card/equipment within the time limit, after taking over of the faulty part from client, then a penalty of Rs 10000/- per day shall be levied for the days of delay from the expiry of time limit in receipt of replacement item at designated site or as defined in contract.
 - Bidder to note that in case bidder delays to deploy service engineer at site within the time limit, then a penalty of Rs 10000/- per day shall be levied for the days of delay from the expiry of time limit.

The penalty shall be deducted from the BG submitted by the bidder.

In case of failure of any equipment, replacement is send immediately within 15 days. It is advice that Vendor should keep sufficient spare for warranty support in its stores (designated store to be informed during detailed engineering).

If the replacement is not send within specified time then penalty at the rate as

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define above or as define in contract has to be imposed. In case bidder still not responds then same may be deducted from the CPBG as per the terms and condition of the contract. Also vendor to provide firmware upgrades and configurator software upgrade free of cost to IGGL within warranty/extended warranty period.

System Warranty including all services and spares for operation and maintenance of the system.

7.0 POST WARRANTY MAINTENANCE CONTRACT – Comprehensive for 5 years

- a) The Vendor shall quote for providing post warranty maintenance for 5 years (comprehensive for all supplied equipments) after completion of warranty /extended warranty period and provide technical support for the maintenance of the Telecommunication and associated system / subsystem including any repair / replacement of faulty cards/ equipments.
- b) One number resident engineer with minimum 2 years experience shall be provided each at each NMS server location during the PWMC period.
- c) The proposal shall include travel, boarding & lodging of service engineer as and when required i n case of site visit.
- d) In the event of any malfunction of the system hardware/ system software, vendor will provide technical guidance to IGGL to resolve the issue with available spares with IGGL. In case the problem is not resolved through remote technical guidance then the vendor should sent experienced service engineer to site within 24 hours on the receipt of such information from owner and rectify the issue. In case of failure of any equipment, replacement has to be sent immediately within 7 days. This time limit is counted from the date of intimation of fault to the vendor. It is advised that Vendor should keep sufficient spare for warranty support in its stores (designated store to be informed during detailed engineering). If the replacement is not sent within specified time, then penalty at the rate of Rs 5000/- per day of the downtime after expiry of time limit or as defined in contract will be imposed.
- e) Owner personnel will work on system day to day basis and wherever possible, owner shall inform the type of failure of hardware/ software to vendor based on diagnostic available with the system. However Vendor shall be fully responsible to attend and rectify the root cause and the failure at the shortest possible time.
- f) Vendor may utilize the spare modules available with owner if necessary and available with owner at site, which is part of mandatory spares supplied with system as per this contract. However the faulty card/equipment needs to be repaired / replaced by the Vendor within a reasonable time (not exceeding 2 months) to maintain bare minimum spares required for the system operation.
- g) The service under Post Warranty Maintenance Contract , including repair/replacement of spare parts and services, shall broadly comprise of:
 - a. 24 x 7 hr Technical Support for resolving issue /modification / upgradation of the system
 - b. Repair/replacement of faulty parts.
 - c. Emergency Service

The bid shall be made lumpsum for 5 years (comprehensive) and the price validity shall be available for the entire period of contract. Payments shall be made quarterly.

8.0 TECHNICAL SUPPORTS ON WARRANTY / POST WARRANTY

The details of services to be provided under warranty shall include but not limited to the following:

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a) TECHNICAL SUPPORT SERVICE

Technical Support Services that extends coverage for IGGL after handover of the system. This includes 24 hours x 7 days a week on line support. IGGL shall utilize this service by intimating the Vendor of its unique customer ID in case of any contingency and Vendor in turn provide telephonic support. Depending upon the severity of the issue, engineer shall be sent by Vendor to the site. Vendor shall have service backup facility.

b) DOCUMENTATION DELIVERY SERVICE

Under Documentation delivery service Vendor is required to provide engineering practices and Technical Bulletins for updates at free of cost. All the latest software upgrades and updates for complete system are also required to be providing under warranty.

2 YEARS MANUFACTURER'S RECOMMENDED OPERATION & MAINTENANCE SPARES

Vendor shall attach a list of 2 years recommended operation & maintenance spares along with the unit rates on respective sub vendors letterheads, which would be necessary for 2 years trouble free operation and maintenance of the system after PWMC. The Owner shall be free to select the items of spares and the quantity at the time of award of contract or during the contractual period including PWMC.

2 year Operation & maintenance OEM suggestive spares, each module, with complete list, part no, unit rate shall be provided. The validity of rates shall upto contractual period including PWMC from date of commissioning / acceptance of complete work (i.e. 2 years warranty + 5 years PWMC- total 7 years) .

These spares are for the use of client after PWMC / or any breakdown during PWMC/ warranty / Extended warranty on replacement basis by the vendor on emergency.

Spares shall be provided from the same manufacturing facilities/location from where the respective equipment, subsystems are offered. Unit rates for each spares required for operation and maintenance shall be provided. Vendor shall provide the address, contact person, fax, and telephone number of the manufacturer of the spare parts. The Vendor shall warrant that spare parts for the system would be available for minimum of 10 years after warranty period after system commissioning (taking over). After this period if the Vendor discontinues the production of spare parts, then he shall give at least 24 months prior notice to such discontinuation so that Owner may order the requirements of spares in one Lot.

9.0 SUBMISSION OF COMPLIANCE REPORT

Vendor shall submit clause by clause compliance to the requirement of specifications with cross reference to the document submitted in the bid. The compliance form has to be submitted. Each of the pages shall be stamped and signed by the authorized representative of the vendor. Any of the clauses neither responded nor appropriately cross referred as per the submitted document shall be treated as Not Complied and

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liable for rejection.

10.0 GENERAL INFORMATION FOR PROJECT EXECUTION

Vendor shall arrange sufficient manpower and material for installation and commissioning of the network at all location.

10.1 TEMPORARY POWER SUPPLY

Vendor shall arrange for the temporary power supply during installation, testing and commissioning of the network.

10.2 UTILITIES POWER SUPPLY AVAILABILITY:

Client will provide UPS supply from Grid Power or Solar Power System at all station of the pipeline. UPS powersupply shall be provided at one point within battery limit for the Telecom vendor. Telecom vendor provide and lay the cables upto Telecom equipments as per requirements & generate all other voltage levels if required. All necessary DC-DC and DC-AC converters and rectifiers shall be in the scope of vendor.


Necessary surge protection devices of suitable rating shall be provided for all incoming supply and communication channel. Station wise tentative power and maximum allowable load at each station is indicated below. The vendor shall indicate actual power requirement for the offered system. Please note that from the DC rectifier unit, 48 V DC will be provided in the form of (+ - 48 V DC). Positive isolation shall be provided and is included in telecom vendor scope.

Cabling (shall be armoured FRLS) from the PDB / DCDB to telecom panel / sub units are in the bidder's scope. Surge protection device has to be provided for all incoming power supply to telecom equipment.

Dedicated separate Cu-Earthing along with dedicated earthing pit has to be provided by telecom vendor. All works for construction of earth pits, including supply of each required item, is included in scope of the bidder. At all other locations, minimum one number earth pit shall be provided. However, if single earth pit does not provide the required resistance value at any station, more number of earth pits shall be provided, without any cost implication, till the required resistance value is achieved.

IGGL/VCS shall provide the Telecom control Room having necessary trenching for installing the equipment. However on trench foundation channel, base frame of telecom panel has to be erected by telecom vendor as per the requirements. Necessary channel & welding work as required in the telecom vendor scope.

Bidder shall furnished power consumption details equipment wise / location wise at the time of bid/ detailed engineering. Bidder shall ensure that the power consumption of the equipment supplied by the bidder shall be within the maximum allowable load indicated below in the table. If the power consumption of the equipment supplied by the bidder exceeds the total allowable load specified below, in such case , bidder shall provide the UPS system of required capacity and voltage level without any additional cost implication to IGGL/ VCS.

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Sl No	Station	Power Source	Power supply	Max. Allowable load (Watts)
1	Proposed Server locations	UPS (Grid)	230 V AC, 50 Hz	MPLS –TP server including WS: 1000W, CCTV server including WS:2000 WIP EPABX server including NMS: 1000W
2	Locations with EPABX system	UPS (Grid)	(+ -)48 V DC	1000 W combined for MPLS –TP , EPABX, Cameras, phones, gateways and associated equipments
3	All other stations	UPS (Grid)	(+ -)48 V DC	600 W combined for MPLS –TP , Cameras, phones, gateways and associated equipments

Note – Kindly note that bidder shall adhere to the power requirement specified above and power consumption of the provided system shall be within the stipulated power as defined above. In case, the power consumption of the supplied system exceeds the power as stipulated above, in such case 96V DC (at locations where solar power is available) and 230V AC (at location where UPS is available) power supply shall be provided to the bidder and necessary UPS and power supply converter for the same shall be provided by the bidder and same is included in scope of the bidder.

10.3 SUPPLY AND STORAGE OF EQUIPMENT

This shall include but not limited to supply and storage of equipment and all other items required for installation and commissioning of the network including the following:

- Storage of all the supplied equipment, including insurance, safety, surveillance etc. is the responsibility of the bidder till handing over of the system to client and same is included in scope of the bidder.
- Bidder shall maintain store at site for storage of all the supplied materials in each state. Payment for the store shall be claimed by the bidder as per the quoted rates after receipt of material at store, from date of receipt of material at store to the date till which the materials are stored in the store. The store has to be maintained for each state /regions of pipeline and billed as per the requirements. Insurance, safety, surveillance etc. of all the supplied materials in the store is included in scope of the bidder and cost of the same shall be covered in the quoted price.
- Transportation of equipment and all other components from locations of manufacturing to bidder's store and then to the locations of installation.
- Storage during transit & storage after installation till handing over to the Owner.
- Statutory clearances including clearances of Customs, Excise, Octroi and others, as required for all the supplied items.
- Responsibility of all the supplied material till handing over of the system to client

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is included in scope of the bidder. In case of any damage, theft etc. To the supplied material, same shall be replaced by the bidder without any cost implication to Client/ PMC.

10.4 SITE PREPARATION

This includes all electrical, civil works and site preparation activities at the equipment nodes along pipeline for installation and commissioning of the Telecommunication equipments including but not limited to:

- Preparation of Earthing Pit and providing Earthing for the equipments at the Equipment nodes.
- Upon completion of OFC laying activities by the OFC laying Contractor, the Telecom vendor shall take over the OFC after testing jointly with the laying contractor or the Client's nominated agency, witnessed by Client/ Consultant in line with the approved OFC Hop Test procedure.
- The telecom contractor shall be fully responsible for optical fibre communication, including cable for reliable operation of the communication system. All the necessary technical support during splicing and termination of OFC to FTC shall be provided to Telecom contractor to OFC Laying contractor for smooth working and handing over.

All testing arrangements and equipments such as OTDR, Talk-set, Optical splicing machine, Optical Laser Source and Optical Power Meter, patch cord, pig tails for this testing and acceptance shall be made available by the Telecom vendor for end to end testing during handing over. For this the vendor shall make arrangements and come forward for acceptance of OFC links on notice from Client/ EIC.

ACCESSORIES / OTHER ASSOCIATED ITEMS

Procurement, supply and Installation of DDF/FDF / Telecom Equipment routine the fibres from FTC to FDF with a required length of Optical Fibre Cable and cabling between the Equipments and DDF's and all other items not indicated here but required for completion of the system shall be in the scope of the vendor.

Supply & Installation of necessary equipment, cables trays, cables & accessories to meet the overall system requirements along Natural Gas Pipeline, extension of telephone cables at respective sites, separate earthing & lighting protection of indoor telecom equipment at respective telecom locations etc.

Furniture (Executive chairs/Printer table) as required for various systems, sub-systems, equipment etc shall be supplied by the Vendor.

System integration including providing requisite interfaces and accessories to realize the complete system, which shall include but not limited to the following:

Integration of the optical transmission system with other subsystems, leased line network and the optical fibre cable (laid and terminated by other contractor), providing connectors, pigtails etc. to realize the complete optical fibre communication system in a redundant mode.

CCTV video surveillance system has to monitor the movement of personnel within the

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compound of all SV'sstations and any other unmanned station along the route as per requirement of the owner.

Integration of IP phones from all sites to the EPABX for enabling switching of call wherever required. Leased lines as defined has to be provide and connected to OFC network for seamless integration.

Supply of the Technical Literature, Drawings and Documentation for the complete system is in the Vendors scope.

Supply & installation of DC power Distribution Box (DCDB) with (N+1) spare capacity of 48 VDC power feed / terminations if specified for future use and complete wiring from the distribution box to the respective telecom equipments at telecom station as per specifications in the vendor scope.

The vendor shall extend the power from Client's provided power point to the DCDB, to be installed in the equipment room using the armoured DC cable. For the same, the DCDB and armoured cable & glands shall be supplied and installed by the vendor.

Any item of goods/services not specifically mentioned, but considered essential for completion of the work in all respects shall be deemed to be included in the scope of work of the successful Vendor.

10.5 SOURCE OF SUPPLY:

The Vendor shall source the supply of different equipments/ accessories as per the list of Source of Supply enclosed in the last of specification.

10.6 SYSTEM PROVENESS:


The MPLS –TP system, CCTV system, EPABX system, and its equipment offered will be the extension of existing proven system and Vendor shall responsible to meet the Provenness (combined or separately) as define in the existing system.

10.7 CERTIFICATE FOR LOGISTICS SUPPORT

Vendor shall provide backup engineering, maintenance support and spare part supports for a period of ten (10 years) for the system being supplied.

11.0 PACKING:

All equipments shall be individually packed in suitable containers/crates designed to avoid damage to the equipments during transit and storage in accordance with best commercial practice and with the requirements of applicable specifications. The material used for packaging, wrapping, sealing, moisture resistant barriers, corrosion preventers, etc. shall be of recognized brands and shall conform to best standards in the areas in which the articles are packed. The packing shall protect the equipment from impact, vibration, rough handling, rain, dust damp, insects, rodents etc. Each container/crate shall be subjected to impact, vibration and other mechanical tests. Each container shall be clearly marked with the following information at prominent places.

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CLIENT	IGGL India Limited.
PROJECT	NATURAL GAS PIPELINE PROJECT FOR NORTH EAST GAS GRID PIPELINE
DESCRIPTION ADDRESS	SERIAL OF EQUIPMENT PO NO.

All equipments shall be tested for damage after their receipt at respective sites. If any equipment, part, subsystem, component, accessory is found to be damaged during the transit, the same shall be replaced by the Vendor, free of all costs to the Owner. The vendor shall replace such item as shall be indicated to him within 30 days of receipt of information.

12.0 TRAINING:

There shall be at least two training courses, one at vendor / manufacturer premises and another at site(s) when the system will be made operational. It shall be explicitly understood that owner's personnel shall be fully associated during engineering, installation, testing and commissioning activities and this opportunity shall be taken by Vendor to impart on the job training in addition to the two mentioned above.

Vendor shall provide comprehensive documentation, course materials, manuals, literature etc. as required for proper training of owner's personnel at his own cost. After the completion of the course, all such materials shall become the property of IGGL.

Training at Vendor/Factory Premises: Training on general functioning of supplied systems, card/module/sub-system wise details, system fault diagnosis / troubleshooting, upgradeability, add-on features and other relevant details shall be given at the factory site/vender premises at the expense of the Vendor. However, Travel & boarding charges of IGGL personnel during the training period at factory site/vender premises will be borne by IGGL.

Training at Site: Training to IGGL personnel on day-to-day operation, maintenance, local & remote monitoring, details of installed setup / configuration of equipment etc shall be provided at site.

Bidder shall train an agreed number of personnel of owner in all aspect of Telecommunication system. There shall be at least two training courses: It shall be explicitly understood, however, that Owner's personnel shall be fully associated during Engineering, Installation, Testing and commissioning activities and this opportunity shall be taken by bidder to impart on-the-job training in addition to the two mentioned above. Bidder's offer shall exclude costs of transportation, lodging and boarding of the Trainees, which shall be arranged by the owner.

First Course: The bidders' quote shall include 10 days training at manufacturer's works/Integration Centre to be imparted by OEM of CCTV, MPLS -TP , IP EPABX, GATEWAYS, with respective NMS. Number of owner's personnel shall be 5 persons each in two batches.

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The first course to be conducted at the manufacturing facilities/Integration Centre shall be designed to train the trainees in all aspects of System Engineering, Equipment operation and functional details, theory of operation of equipment, trouble shooting and familiarization with the equipment at card and component level. All equipment used for training shall be identical to those supplied for site installation

Second course: The bidder quote shall include 6 days training at site for installed telecommunication equipment's (CCTV, MPLS -TP , IP EPABX, GATEWAYS, with respective NMS). Training to be imparted by bidder and if required; OEM is also to be associated for training. Number of owner's personals shall be 3 persons each in two batches. The second course to be conducted at site, shall be mainly devoted to the operation of equipment and system including testing of equipment/sub-assembly, preventive breakdown, Trouble shooting and normal maintenance activities. The training imparted shall cover all aspects equipment incorporated in the system.

Bidder shall specify in his offer the types of courses he intends to impart, including but not limited to, the ones aforementioned.

Bidder shall provide comprehensive documentation, course material, manuals, literature etc. as required for proper training of personnel at his own cost. Consolidated and comprehensive documentation shall be available to each participant. After the completion of course, all such materials shall become the property of the owner. Bidder shall update the course material of manuals in case there are any changes owing to revisions/modifications in equipment/system specifications.

Bidder shall, Fifteen (15) days prior to start of training, send complete training program including details of each course, duration, subject matter, etc. The Owner/Engineer reserves their right to suggest any additions/deletion in the program, which shall be incorporated by the Bidder at no additional cost.

13.0 VENDOR DATA REQUIREMENT AND DOCUMENTATION

Documents shall be supplied as per Vendor Data Requirement. All documents shall be in English language only.

A) Documents to be submitted within One month.

- Project Schedule.
- Project Organization Chart.
- Quality Assurance program, Equipment & system test plans.
- Technical literature / data sheets / Information doc. of all major equipment to be supplied.
- Source of supply (SOS) with purchase order copy.
- Equipment schedule for various stations.
- Power Supply requirements at each station.
- Station-wise list of all equipments, components etc

B) Documents to be submitted during detail engineering / Supply of materials:

- System description, System configuration diagram & detail design concept for MPLS -TP products/solutions.
- Link connectivity diagram and proposed channelling plan. Detailed

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Network diagram for NMS of MPLS –TP elements. Detail Link engineering calculation based on Optical fibre characteristics & hop length

- Details technical manual of each type of equipment containing circuit diagram and description.
- Layout of equipments and space requirements for each station.
- List of special tools and tackles.
- Equipment interconnection diagram including details of various interfaces signalling protocols used at each stage.
- Power supply distribution, earthing arrangement and station wiring diagram.
- Cable layout drawings inside the building & requirement of all cable trays for each site.
- Installation manual giving manpower requirement, material requirement overall dimensions and weights of each equipment, installation procedure and commissioning.
- Tuning and field calibration procedure for each type of equipment.
- Supervisory configuration, alarm list, operate interface etc.
- Documents regarding accessories (DDF, Cabling between equipments & DDF'S) and other associated items.
- Maintenance manual of each type of equipment and for the entire telecommunication system.
- System description
- System configuration diagram
- Link Engineering of the network
- Link Connectivity diagram
- Station-wise Rack-layout
- Station-wise Bill of Material
- Station-wise Power requirement
- List of special tools and tackles
- List of mandatory spares

c) The following set of documents shall be supplied by the Vendor at all the manned stations and NMS centers (hard copy as well as soft copy).

- Details technical manual of each type of equipment containing circuit diagrams and description.
- Equipment schedule for various stations
- Equipment interconnection diagram including details of various interfaces, signaling protocols used at each stage.
- Layout of equipment and space requirements for each station.
- Cable layout drawings inside the buildings and requirement of all mounted cable trays for each site.
- Installation manual giving manpower requirement, material requirement overall dimensions and weights of each equipment, installation procedure and commissioning.
- Power supply distribution, earthing arrangement and station wiring diagram.
- Tuning and field calibration procedure for each type of equipment.
- Supervisory configuration, alarm list, operator interface etc.
- Maintenance manual of each type of equipment and for the entire telecommunication system.

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- d) The following set of documents shall be supplied by the Vendor at NMS centers (hard copy as well as soft copy).
- NMS Software (including Application and OS) in CD / DVD media along with Licenses
 - LCT Software (including Application and OS) in CD / DVD media along with Licenses for each LCT set at respective locations.

The maintenance manual shall be divided into two sections as a minimum:

A) Preventive maintenance procedures

B) Trouble shooting procedures including failure analysis:

The section on repairs shall provide exhaustive information repairs including but not limited to removal, reinsertion of components and cards, repairs, adjustments, tuning, calibration, tools required for a particular operation, test points, including turn around time for repair and the details of the maintenance support service centre to be furnished in the bid and all other maintenance related details..

- Quality Assurance program, Equipment & system test plans.
- Expansion possibilities of the system without causing deterioration in the system performance.
- Any other data, document not specifically mentioned, but required for the satisfactory completion, operation and maintenance of the system shall be provided.
- Factory Acceptance test procedures.
- PRE-FAT test results

Documents to be supplied after FAT before start of installation:

- List of commissioning spares
- Site Acceptance Test procedures

Documents to be supplied after trial runs but before System commissioning (Final Acceptance of the System by Owner/Engineer):

STATIONS FOLDERS:

In addition to the six sets mentioned earlier, bidder shall supply 1 set of station folders at all telecom stations. The station folders shall include the following as a minimum:

Final system diagram description modification made as compared to system offered at bid stage, final wiring diagram system commissioning report, all the performance results of various equipments and for system as a whole for Test and Trial runs.

Details of the bandwidth available, details of hardware/ software required to utilize the bandwidth available along with details of the various cards, part nos. location from which the same can be procured with details of the contact person, fax, telephone nos. etc.

MAINTENANCE FOLDERS

In addition to the six sets mentioned earlier, bidder shall supply 1 set of maintenance folders at NOIDA projects sections. The maintenance folders shall include the following as a minimum:

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Final modified equipment detailed catalogues, maintenance manual equipment tuning and calibration manual. Circuit diagrams including component layout of all modules for each subsystem, equipment etc

STATION INVENTORY FOLDERS

In addition to the six sets mentioned earlier, bidder supply 1 set of station inventory folder at each telecom station. The station inventory folder shall include the following as a minimum (the exact quantity shall be documented and signed by bidder and countersigned by Owner/ Engineer.

- Station-wise list of all equipments, components etc.
- Spare part list.

The spare part list shall include the following as a minimum:

- List of spares available per station basis.
- Type of system (Optical, Microwave etc.)
- Name of equipment
- Description of Card
- Reference No.
- Name, Address & Contact Person of manufacturer & supplier
- Information regarding repair ability at factory/site.

Note:

In addition to the 6 sets hard copies, 6 sets of soft copies of the finalized document shall be provided in CD- ROMs before system commissioning (final acceptance of the system of Owner/ Engineer) as AS BUILT FINAL DOCUMENTS.(contents: Contract PO, FDS, FAT/ IFAT, IC, SAT, Manuals, Warranty/Guarantee, Site dwgs etc)

14.0 COMPLETION PERIOD

As per bid documents; refer Vol I of II of bid documents.

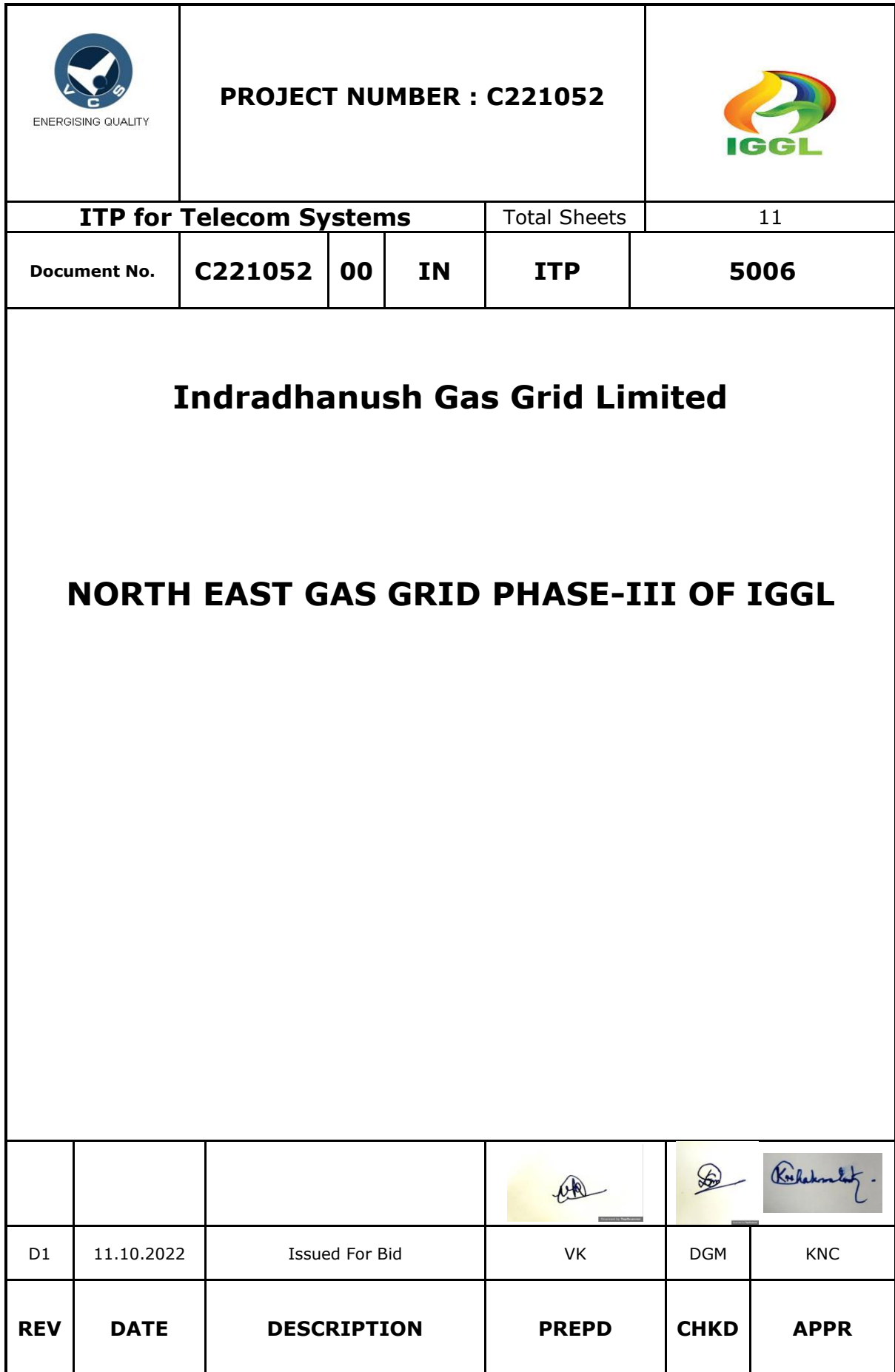
15.0 EQUIPMENT QUALIFICATION CRITERIA (EQC)- TECHNICAL:

The Telecommunication System (Internet Protocol - IP based) and various sub items such as MPLS –TP equipments, IP EPABX & Phones, CCTV system & Cameras, Video conferencing equipment etc required for IGGL pipeline proposed to be supplied shall be proven, from the existing range of respective manufacturer and should have successfully tested, installed & commissioned. The MPLS –TP equipment and NMS shall be proven and must have supplied & commissioned in hydrocarbon pipeline applications.

16.0 ANNEXURES

ANNEXURE – I to ANNEXURE – XIII (refer Index sheet)

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3.0 QUALITY ASSURANCE PROGRAMME AND IMPLEMENTATION METHODOLOGY

- This shall include but not limited to preparation of detailed quality assurance programme, quality control parameters for equipment manufacturing and implementation of the systems, preparation of implementation methodology covering schedule of supply, installation, testing and commissioning. The Equipment/System design has to be approved by IGGL/PMC before actual manufacturing/supply of the equipment.
- IGGL /PMC shall carry out Factory Acceptance Test (FAT) and Integrated Factory Acceptance Test (IFAT) for the offered system/equipment. Vendor shall make necessary arrangement for the testing of the same in presence of Owner's representatives before the dispatch of materials to the sites. Subsequently, vendor shall take up the installation and commissioning of the equipment / system at site. If the bidder is the OEM, combined FAT and IFAT shall be done.
- Upon successful completion of installation of the equipments / systems at sites, Site Acceptance Tests (SAT) shall be undertaken. SAT plan shall be proposed by vendor and approved by Engineer-in-charge. After successful completion of SAT of all supplied equipments/items, Test run shall be conducted.
- For FAT, IFAT, SAT & Test Run, vendor shall also adhere to the instructions as specified under "Inspection & Testing Guidelines" mentioned below.

4.0 TEST CATEGORIES

The following tests (in the same sequence) shall be conducted for acceptance of the equipments and the system before final acceptance of the system.

1. Pre-Factory Acceptance Testing,
2. Factory acceptance Testing (FAT)
3. Integrated Factory Acceptance Testing (IFAT)
4. Pre-commissioning Test (after installation) for total integrated system.
5. Site Acceptance Testing. (SAT)
6. Trail Run.

A detailed procedure for FAT, IFAT, SAT shall be provided for approval as a minimum requirement for a system. FAT, IFAT and SAT requirements for individual sub systems shall also be provided. Where possible the Owner prefers a FAT at one location for checking the functionality of telecommunications system in totality.

These tests shall be carried out on all equipment supplied by Bidder. Bidder shall arrange all necessary test instruments, manpower, test-gear and accessories for FAT, IFAT and SAT

All technical personnel assigned by Bidder shall be fully conversant with the system specifications and requirements. They shall have the specific capability to make the system operative quickly and efficiently and shall not interfere or be interfered by other concurrent testing, construction and commissioning activities in progress. They shall also have the capability to incorporate any minor modifications/suggestions put forward by Owner/Consultant.

4.1 INSPECTIONS AND TESTING GUIDELINES:

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i. TEST PLAN :

For all types of inspection & testing under FAT, IFAT, SAT & Test Run vendor shall prepare and submit Test Procedures & Plans to IGGL /PMC for their approval. The Test plans & procedures need to be submitted well in advance before the commencement of actual testing. The procedures/plans shall include time schedule for the tests, purpose/objective of test, test set-up schematic, required test equipment, identification of test inputs, test procedure and details of desired output/test result, a column for actual value obtained during the tests and remarks on test result.

ii. TEST REPORT:

The observations and tests results obtained during various tests shall be compiled and documented to produce Test reports by the Vendor.

The Test reports shall be prepared & submitted for each equipment/ item and the system. The report shall contain the following information as a minimum:

- Unit/Equipment under Test
- Test equipment used
- Test conducted.
- Test procedures.
- Test results.
- Remarks & comparison of tests results with the anticipated test result as given in test plans and reasons for deviations if any.

iii. IGGL and/ PMC or third party/agency (appointed by IGGL), reserve the right to inspect and test each equipment at manufacturing / supplier premises and at site during the installation & commissioning of the system. The inspection and testing shall include components, sub-assemblies, produced units for verifying and testing their guaranteed performance & specifications.

iv. It shall be explicitly understood that under no circumstances shall any approval of IGGL /PMC or his representative shall relieve the Vendor of his responsibility for material design, quality assurance and the guaranteed performance of the system and its constituents.

v. Vendor shall inform the owner, at least 14 days in advance of the date at which the system would be ready for Inspection & Testing. All relevant documents and manuals shall be submitted to IGGL /PMC before the time. For factory inspection and testing,

vi. Bidder shall arrange all that is required e.g., quality assurance, personnel, space, test gear for successful carrying out of the job by the Owner/Consultant, at Bidder's cost, at the Bidder works.

vii. Owner/Consultant shall have free entry and access to all parts of the

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Bidder's facilities associated with manufacturing and testing of the system at any given time.

viii. Owner or his representative shall, after completion of inspection and testing to their satisfaction, issue factory acceptance certificates to release the equipment for shipment. No equipment shall be shipped under any circumstances unless a factory acceptance certificate has been issued for it, unless agreed otherwise by Owner/Consultant

- Vendor shall arrange sufficient manpower of required skill and material for implementation of new equipment & associates systems/items at sites. All technical personnel assigned by the Vendor shall be fully conversant with the system specifications and requirements. They shall have the specific capability to make the system operative efficiently and shall also have capability to incorporate any minor modifications/ suggestions put forward by the owner.
- Till IGGL /PMC accepts the system, a log of each and every failure of components shall be maintained. It shall give the date and time of failure, description of failed component, circuit, module, component, effect of failure of component on the system/ equipment, cause of failure, date and time of repair, resolution of fault, mean time to resolution etc.

Repair/modification done at any point of time at one site shall be carried out by bidder at all the sites. Detailed documentation for the same shall be submitted to Owner for future reference

If the malfunctions or failures of a unit/module/sub-system/equipment; repeat during the test, the test shall be terminated and Vendor shall replace the necessary component or module to correct the deficiency. Thereafter, the tests shall commence all over again from the start.

If after the replacement, the equipment still fails to meet the specifications, Vendor shall replace the equipment with a new one and tests shall begin all over again.

If a unit/sub-system/module has failed during the test, the test shall be suspended and restarted all over again only after the Vendor has placed the Equipment back into acceptable operation. Owner's approval shall be obtained for any allowable logistics time required to replace the failed component/unit/module/sub-system.

Readjustments

No adjustments shall be made to any equipment during the acceptance tests. If satisfactory test results cannot be obtained unless readjustments are made, Vendor shall carry out only those readjustment needed to ready the equipment/system for continuance of tests. A log of all such

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adjustments shall be kept giving date and time, equipment, module, circuit, adjustments, reasons, test result before and after adjustment etc. Fresh acceptance tests shall be conducted after the readjustments have been completed.

4.2 Pre Factory Acceptance Testing (FAT)

The vendor on his own exactly in line with approved FAT / IFAT shall conduct pre-factory acceptance testing and test reports along with photographs for the same shall be forwarded to Owner/Engineer before start of IFAT/FAT.

Pre factory acceptance tests shall be carried out after review and approval of IFAT/FAT procedure/documents as per requirements.

4.3 FACTORY ACCEPTANCE TESTING (FAT):

Factory acceptance tests shall be carried out after review and approval of FAT procedure/documents as per tender requirements and review of Pre-Factory acceptance results & shall be conducted at the OEM's facilities.

The factory acceptance testing shall be conducted in the presence of the representative Owner. The tests shall be carried out on all individual systems/items including those supplied by Sub-vendors. After completion of FAT, factory acceptance certificates shall be issued. The FAT shall include but not be limited to:

(i) Equipment Testing:

- Mechanical checks to the equipment for dimensions, inner and outer supports, finishing, welds, hinges, terminal boards, connectors, cables, painting etc.
- Electrical checks including internal wiring, external connections to other equipment etc.
- Check for assuring compliance with standards mentioned in the specifications.
- Individual check on each module/sub-assembly as applicable
- Checks on power consumption and heat dissipation characteristics of various equipments
- Functional testing covering the features & functions of new systems/equipment along-with its associated items
- Any other test not included in FAT document but relevant to the project as desired by the Owner/Engineer at the time of factory acceptance testing.

(ii) System Integration Testing:

Functional and performance test of the all supplied systems/equipment under their respective integrated setup to provide required

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facilities/functionalities as per tender requirement shall be conducted as approved procedure of IGGL /PMC. The details of integrated setup will be finalized after the award of contract.

Following equipment shall be included as a minimum for FAT (by owner / Consultant) at **Manufactures works** where the material is actually manufactured & tested:-

All MPLS –TP equipments along with NMS.

4.4 Integrated Factory Acceptance Testing (IFAT)

The vendor on his own exactly in line with individual FAT shall conduct integrated factory acceptance testing (IFAT).

Integrated Factory acceptance tests shall be carried out after review and approval of IFAT/FAT procedure/documents as per requirements and review of PRE-Factory acceptance results & shall be conducted at the manufacturing facilities of MPLS –TP or Integration Centre or designated testing facilities having proven facilities to test all the equipments along with the manufacturer representative and the network as envisaged in any project.

The integrated factory acceptance testing shall be conducted in the presence of the Owner/Consultant. All OEM representative as required shall be present during inspection.

Following equipment shall be included as a minimum for IFAT (by owner / Consultant) and shall be available at the IFAT facility during IFAT:-

- I. All MPLS- TP equipments fully wired in rack.
- II. All CCTV system along with NMS & cameras.
- III. Clocks.
- IV. All Telephones with all Telephones Gateways, Acoustic Booth, Howler and Beacon
- V. All Test Instruments
- VI. All LCT
- VII. All consoles
- VIII. All the Racks in fully wired condition
- IX. Cables

All the above mentioned items shall be available during IFAT at the place of conduction of IFAT. It is the responsibility of the contractor to ensure that all the items are available at the testing facility location before raising the call for IFAT.

For IFAT, all the MPLS –TP , EPABX and servers shall be installed and wired in the respective racks. The pre- iFAT testing shall be conducted by the contractor in the wired racks itself and the reports along with photographs shall be submitted to IGGL/ MECON for review before raising call for IFAT.

5.0 INSTALLATION, TESTING AND COMMISSIONING:

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5.1 Installation

- 1) After successful completion of integrated factory acceptance testing (IFAT) of new equipments and associated items, they shall be sent to site for installation. Any equipment/associated item without factory acceptance certificates shall not be acceptable at site.
- 2) IGGL /PMC will provide dark fibre, space and power for installation and commissioning of new equipment along with associated systems/equipments at sites.

Bidder shall also have to provide the site-wise Space & Power requirement for the offered system/equipment along with the bid document.

- 3) For the installation of supplied new equipment & associated items etc at site(s), the vendor shall carry out the following site preparation works as a minimum:
 - Installation & fixing of equipment rack / equipment (as per available) for housing new equipment & associated items along with restoration of floors or walls after masonry or drilling works, as required.
 - Installation of suitable type of cable trays / conduits as required for routing, distribution & extension of various cables. These cable trays/conduits shall be installed / mounted suitably in vertical or horizontal planes keeping in view of the aesthetics of equipment room.
 - At unmanned/ manned locations power will provide in the electrical rooms adjacent to telecom rooms. Vendor shall supply, install, test & commission panel meeting the technical specification of tender document, at these un-manned locations in electrical rooms. Vendor shall carryout all required activity related to laying, routing, conducting, termination, dressing, saddling, hole-through in walls, labeling etc for extension of power cable from electrical rooms to telecom rooms at all sites. For extension of power, power cable of minimum **3 core 10 sq.mm** armoured power cable (Cu) of appx. **30 meter** length per site shall be used by the vendor.
 - AC power at server locations, Power from Power Distribution Board to vendor supplied equipments & associated systems should be extended using 10 sq.mm armoured power cable.
 - All types of power cable termination and earth cable termination shall be carried out using copper lugs.
 - New earthing pit and earthing shall be provided.
 - Each system/equipment sub-rack shall be provided with Anti static wrist wrap.

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- Suitable gland shall be provided for all cabling.
- All types of cables shall be labelled on both ends for the identification.
- The scope of work related new PRC and SRC system shall include but not limited to the following:
 - (i) Supply, installation, integration & commissioning of new PRC and SRC clock meeting the technical specification of the tender.
 - (ii) Supply & installation of software [in supplied Local Craft Terminal (LCT) of MPLS –TP equipment] for local management of all components of new PRC and SRC systems.
 - (iii) Depending on the synchronization requirement in line with ITU-T recommendations for new MPLS –TP network will be deployed in network location(s) after detailed engineering by the vendor. The decision of location will be finalized by IGGL & vendor during engineering phase of the project after award of the contract.
- CCTV and leased lines shall be installed as per the planning.
- Before taking up the installation of new equipments & associated systems, the same shall be checked for completeness as per the specifications of the same as required for a particular station. Installation shall be carried out in accordance with the installation manuals and approved installation drawings in the best workmanship.
- Vendor shall provide suitable numbers of manpower of required skills & technical expertise at his own cost for completing the work within the stipulated time frame.
- Vendor shall bring all installation tools, accessories, special tools, spares parts etc. at his own cost as required for the successful completion of the job. Vendor shall include all installation materials required for proper installation of the new equipments & associated systems. These shall include but not be limited to, all connectors, inter-bay and inter equipment cables, power supply cables and connectors, power distribution boxes, anchoring bolts, nuts, screws, washers, main distribution frames, junction boxes etc.
- The installation of equipments shall be done as to present neat and clean appearance in accordance with approved installation document drawings. All inter bay, power supply and other cables shall be routed through cable trays. No cable shall be visible. All through wall openings, trenches etc. shall be properly sealed to prevent the entry of rodents, insects and foreign materials.
- If during installation and commissioning, any maintenance is undertaken, the maintenance spares supplied with new equipments & associated systems shall not be used for the maintenance. Vendor shall arrange his own spare parts for such activities till the system has been finally accepted by the Owner. A detailed report & log of all such maintenances shall be made available by the vendor to Owner/Engineer and shall include cause of faults and maintenance details.

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- A detailed time schedule for the activities to be undertaken shall be submitted by Vendor to Owner/Engineer to enable their representatives to be associated with the job.

5.2 Pre-Commissioning

- 1) Upon completion of the installation/erection of equipment, they shall be jointly inspected by Vendor & IGGL / PMC representatives before start-up operations are undertaken. The correctness and completeness of the installation as per manufacturer's manual & approved installation documents shall be gauged leading to pre-commissioning activities at site.
- 2) Vendor shall carryout necessary provisioning/configuration/integration of newly installed MPLS –TP equipment/systems as per site-wise equipped configuration detailed at desired sites/locations and IP based EPABX systems, CCTV system & cameras.
- 3) During pre-commissioning, if any fault occurs to any new equipment/associated system/item, vendor shall identify the same and provide report/history of all faults to the Owner.
- 4) During installation and pre-commissioning of the new equipments & associated systems, vendor shall have enough number of commissioning spares so that the installation is not held up because of non- availability of commissioning spares. Vendor shall ensure that the spares meant for operation and maintenance is not used during installation and commissioning.

5.3 SITE ACCEPTANCE TEST (SAT)

On completion of Pre-commissioning & integration of new equipment, the Site Acceptance Testing (SAT) shall be conducted by the vendor for the new equipments & network as per approved SAT procedure under the presence of Owner/Engineer.

For carrying out test/inspections & measurements during SAT, The vendor shall arrange all required calibrated test equipment / instruments, tools / tackles and skilled, trained & competent manpower.

SAT shall include but not be limited the following:

- Checks for proper installation as per the approved installation drawings for each equipment & associated systems/ items.
 - Functional testing covering the features & functions of new equipments along-with its associated systems/items to meet site specific requirements.
 - Testing of supplied Spares modules / cards
 - Any other test not included in SAT document but relevant for site operation

5.4 NETWORK STABILITY TEST

Upon completion of the site acceptance testing (SAT) of equipment & facilities at sites, Network Stability Test will be conducted for a continuous period of 72 hours. During this test, end-to-end BER (Bit Error) Test will be conducted for new MPLS –

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TP networks of pipelines.

5.5 TRIAL RUN:

Upon successful completion of the Network Stability Test, vendor shall keep the all the supplied equipment & facilities including new MPLS –TP network, NMS, Network Clocks and associated systems of pipelines commissioned for 30 days for 'TRIAL RUN' to monitor them for 30 days from NMS and using MPLS –TP Analyzers & Ethernet Testers to meet performance objectives as per ITU-T recommendations: G.826 and G.821.

During this period, vendor shall provide all specialist Engineers & Technicians including experts at all NMS locations, so as to maintain the total log, incidents, failures & for assisting site engineer & for total co- ordination. However, the normal operation and maintenance of the system shall be performed by the personnel of the Owner trained for the purpose.

If during 'Trial run' any defect is noted in the system, the vendor shall rectify, replace the same to the satisfaction of IGGL. The decision to repeat the final test or restart the 'Trial' shall be of IGGL depending upon the severity of the defect.

During trial run, if any fault occurs to any equipment of system, vendor shall identify and rectify the same and provide report, history of all faults to the Owner. Ideally, during the Trial run, no shutdown of the system due to failure of equipment should happen. A record of all failures shall be kept for each manned/unmanned station and the availability of the system shall be calculated and accordingly, results shall be submitted by the vendor to IGGL.

If the system fails to come up to the guaranteed performance, the Vendor, within a period of thirty (30) days shall take any and all corrective measures and resubmit the system for another 'Trial Run'. All modifications, changes, corrective measures, labour etc. shall be at the cost of the Vendor. In case the date of completion for the second trial run exceeds the time schedule for the project, he shall be liable to pay liquidated damages. If the system fails to reach the guaranteed performance even after the second trial run, the Owner shall be free to take any action as he deems fit against the Vendor and to bring the system to the guaranteed performance with the help of third party at the expense of the vendor.

5.6 COMMISSIONING:

The new MPLS –TP network and associated equipment/system of pipelines shall be considered to be commissioned and taken over, only after successful completion of their Test run. However, the takeover by owner shall not be delayed for non completion of minor works and such jobs which do not affect the normal operation of the system, and such works/ jobs shall be completed by the vendor in accordance with the plan

/ schedule, which has been approved by the Engineer-In-charge. The date of successful completion of Test run shall be treated as the 'Completion Date' for such purpose as application of contractual provisions such as 'Price reduction schedule for delayed completion' etc.

5.7 SPECIAL TOOLS AND TACKLES

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- Vendor shall arrange the special tools and tackles for the commissioning and maintenance of the telecom system.
 - i. Special tools for MPLS –TP , EPABX, CCTV system, leased lines.
 - ii. G.703 interface 120 ohms to 75 ohms converter/adapter.
 - iii. OFC testing equipments