



RAILTEL CORPORATION OF INDIA LTD.

(A Govt. of India Enterprise)

Territory Office

Plot No. 17, 1st Floor, Raghunath Nagar,
Near Shahpura Police station,
Bhopal MP - 462039

Western Region Office

Western Railway Microwave Complex
Senapati Bapat Marg,
Near Railway Sports Ground,
Mahalaxmi, Mumbai – 400013

Corporate Office

Plate-A, 6th Floor, Office Tower-2,
NBCC Building, East Kidwai Nagar,
New Delhi – 110023

Tender

For

**“Package-I: Unified Network Management System (U-NMS)
for Central Sector & State Sector Communication in
Western Region (WR).”**

Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17

Dated: 10.01.2024

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NOTICE

Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024

RailTel Corporation of India Ltd invites EoI via E-Mail with password protected folder from reputed firms for work mentioned in the Scope of this Tender. The technical and commercial (price) bids shall be submitted through E-Mail at bpltooffice@railtelindia.com in password protected folder as separate PDF documents up to the end date & time mentioned below.

Sr. No.	Description	Estimated Cost	Last date & Time for Bid Submission	Date & Time for Bid Open	Completion Period
1	“Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).”	As per tender document attached As per Tender No: CC/NT/W-MISC/DOM/A06/23/11830	13.01.2024 10:00 Hrs.	13.01.2024 10:30 Hrs.	As per Tender No: CC/NT/W-MISC/DOM/A06/23/11830

Note: In case of any discrepancy or ambiguity in any clause/specification pertaining to scope of work area, Tender no. CC/NT/W-MISC/DOM/A06/23/11830. Selection of System Integrator for “Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).”. will be sacrosanct **(Copy at annexure–VIII).**

PRICE BID

Please Refer BoQ – Annexure -IX

Bidder should quote price for end-to-end SOW wrt–Tender Ref: RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024 and subsequent corrigenda. Selection of System Integrator for “Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).”

Note: In case of any discrepancy or ambiguity in any clause/specification pertaining to scope of work area, the Tender no. CC/NT/W-MISC/DOM/A06/23/11830. Selection of System Integrator for “Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).” will be sacrosanct **(Copy at annexure–VIII).**

1. The details are as under:

1	Issue date of “Invitation for Tender document”	10.01.2024
2	Last date for submission of Tender by applicants	13.01.2024 10:00 Hrs.
3	Opening of Tenders	13.01.2024 10:30 Hrs.
4	Tenders Submission Mode	By email (with password protected)
5	Completion Period	As per tender ref. no. CC/NT/W-MISC/DOM/A06/23/11830

Tender and all corrigenda will be made available at RailTel Corporation of India’s portal <https://www.railtelindia.com>. Tender fee- Rs. 25,000/- +GST as per tender clause. **(For Bank detail Refer Annexure VII)**

Note: For bid submission, tenderer will have to submit signed and stamped printed copy of the tender document.

1. RailTel intends to look for an empanelled BIDDER who can help us with Bid Submission & have the ability to take up the work on turnkey basis and who has good connect with the customer and local environment. The bidder shall bear all costs associated with the preparation, submission / participation in the bid. RailTel in no way will be responsible or liable for these costs regardless of the conduct or outcome of the bidding process.
2. Bidders shall necessarily furnish the details of the valid SD/PBG/Tender fee/fee applicable submitted at time of empanelment for consideration of their offer.
3. Undertaking stating that bidder accept to execute SOW of Tender on fully Back-to-Back basis.
4. Copy of power of attorney issued in favor of signatory
5. The bidder responding to this Tender shall give an undertaking that, if they are successful, then they will not participate directly or with another direct bidder
6. A pre bid agreement will be signed with successful bidder on non-judicial stamp of adequate value as per final bid value. Format will be shared with successful bidder only
7. The Bidder should have average annual turnover from IT / ITES/ICT of The average annual financial turnover during the last 3-years should be at least 30% of the estimated cost. (i.e., for FY 2020-21, FY 2021-22, FY 2022-23)

8. The Bidder must provide acceptance (with documents) on the following:

All payments shall be paid on Bidder back-to-back basis. RailTel shall make payment to selected Business Associate after receiving payment from the end customer for the successful completion portion. In case of any penalty or deduction made by the end customer, the same shall be deducted from the selected BIDDER.

The BIDDER should have the pre-requisite experience for similar type of work.

Bidder will submit No deviation certificate. Bidder will submit non-blacklisted certificate.

Partner will be chosen as per the policy guidelines of RailTel Corporation of India Ltd. Further evaluation will be carried out.

Please submit your proposal latest by upto 13.01.2024 10:00 Hrs.

“All Bidders are required to submit their bids (complete in all aspects) within the time and date as specified in Section 2 (Fact Sheet). The Bids received after the due date and the specified time (including the extended period if any) for any reason whatsoever, shall not be entertained”.

Prospective bidders are required to direct all communications related to this Invitation for

Tender document, through the following Help Desk:

Contact (1)	Ms. Aanchal I Raaj
Designation	AGM/Bhopal
Email	aanchal@railtelindia.com
Telephone	+917552428644
Mobile	+919717644122

Contact (2)	Shri. Anand Kumar
Designation	Deputy General Manager/Marketing
Email	anandnkn@railtelindia.com
Telephone	+917552428644
Mobile	+919004444107

	Check List	
Sl. No	Document	Remarks (Yes/ No)
1	Offer Letter	Annexure I
1	Proof of Submission of PBG/SD/Tender Empanelment Fee submitted against Empanelment with RailTel	
2	Copy of LoA/LOI issued by RailTel for confirmation of empanelment.	
3	Undertaking stating that bidder accept to execute SOW of Tender on fully Back-to-Back basis.	
4	The bidder responding to this Tender shall give an undertaking that, if they are successful, then they will not participate directly or with another direct bidder	
5	Compliance certificate format	Annexure II
6	Financial capacity Format	Annexure III
7	Format for Declaration for acceptance of all Terms & Conditions	Annexure IV
8	Non blacklisted	Annexure V
9	No deviation certificate	Annexure VI
10	RailTel's bank account detail to deposit EMD	Annexure VII
11	Tender Document –CC/NT/W-MISC/DOM/A06/23/11830	Annexure VIII
12	Price Bid (BoQ)	Annexure -IX

Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17

dated: 10.01.2024

ANNEXURE-I:

OFFERLETTER

(To be on company letter head)

Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17

dated: 10.01.2024

To,
Principal Executive Director
RailTel Corporation of India Limited
Western Railway
Microwave Complex
Senapati Bapat Marg,
Near Railway Sports Ground,
Mahalaxmi, Mumbai-400013

Dear Sir,
Sub: Participation in the Tender.

Having examined the Invitation Tender document bearing the reference number Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024 released by your esteemed organization, we undersigned, hereby acknowledge the receipt of the same and offer to participate in conformity with the said Invitation for Tender document.

I/We fully understand the terms and conditions as contained in the EOI document and we agree that the same shall apply to our tender and I/We shall be bound by them.
EMD & Tender document cost details are as follows: -

Tender document cost: -

EMD :-

We hereby declare that all the information and supporting documents furnished as a part of our response to the said Invitation for Tender document, are true to the best of our knowledge. We understand that in case any discrepancy is found in the information submitted by us, our Tender is liable to be rejected.

Date:

Signature with seal—

Name: _____

Designation: _____

Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17

dated: 10.01.2024

Annexure II

Compliance Certificate

To,
Principal Executive Director
RailTel Corporation of India Limited
Western Railway Microwave Complex
Senapati Bapat Marg,
Near Railway Sports Ground,
Mahalaxmi, Mumbai-400013

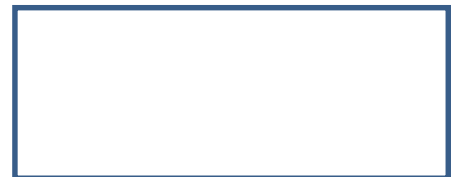
Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024

Dear Sir,

This is in response to the Invitation for Tender for the Selection of System Integrator for “Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).” in Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024 We have applied against Tender issued by RailTel Corporation of India Ltd. We hereby covenant, warrant and confirm. We hereby comply with all the terms and conditions/stipulations as contained in the Invitation for Tender document.

Date:
(in the box)

Signature with seal



Name:

Designation:

Annexure- III**Financial capacity Format**
(to be issued by practicing Chartered Accountant on its letter head)**TO WHOM IT MAY CONCERN**

Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024

This is to certify that M/s having its office at are in the business of for Completed years (considered upto 31st March 2023) and the date of incorporation is _____. The average annual financial turnover during the last 3-years should be at least 30% of the estimated cost, or from date of incorporation (in case of date of incorporation is within Three years of March) are as given below:

Financial Year	Turnover (in Rs Cr)	Profit / Loss (in Rs Cr)
2020-2021		
2021-2022		
2022-2023		

This is further certified that the above Turnover is in line with the Turnover declared by the Firm in their Income Tax Returns filed under PAN.....

Place.....

Signature.....

Name.....

Annexure-IV

Performa for Declaration of acceptance for all Terms & Conditions

Declaration for acceptance of all Terms & Conditions of the

Tender Ref :- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024

1. We M/s (_____) having registered office at
(Address) _____ agree to all the Terms &
Conditions of the
Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024
issued by RailTel.

2. Our offer will remain valid for 90 days from the date of opening of the Tender.
3. We confirm that we have the necessary resources & capabilities to undertake the work as specified in the schedule of work as per all terms and conditions given in the above Tender. We have also understood the process of submitting bid to RAILTEL and Instructions given in the above Tender. Further, we confirm that we shall execute the work against this price discovery for scope as specified in this Tender.
4. We also agree that RailTel has the right to reject all Tender, in part or in full without assigning any reason whatsoever.
5. This Tender along with other documents as stipulated in Tender together with your written acceptance thereof shall constitute a binding contract between us.

Date:-

Name of the Company:-

Signature & Seal:-

Annexure-V

Non - Blacklisting Certificate Declaration

To,
Principal Executive Director
RailTel Corporation of India Limited
Western Railway
Microwave Complex
Senapati Bapat Marg,
Near Railway Sports Ground,
Mahalaxmi, Mumbai-400013

Sub: Undertaking of no deviation from Tender/ RFP terms and condition
Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024

We hereby undertake and submit the declaration that our firm/company is not debarred/black listed for future business with any Central/State Government organization/CPSU/SPSU in India.

In case, at any stage if the above declaration is found false or incorrect, the Purchaser shall be free to take any punitive/legal action against us, as may be deemed fit, which shall be acceptable / binding on us and the consequences shall be to our account.

Date:

Name & Signature of
Authorized Representative:

Company Seal:

Name of Bidder:

Full Address:

Telephone No.:

Annexure-VI

Format for Statement of No Deviation from the RFP

To,
Principal Executive Director
RailTel Corporation of India Limited
Western Railway
Microwave Complex
Senapati Bapat Marg,
Near Railway Sports Ground,
Mahalaxmi, Mumbai – 400013

Date: _____

Sub: Undertaking of no deviation from Tender/RFP terms and condition

Tender Ref: - RCIL WR-BPL/MKTG(EB)/Jan.- 1/17 dated: 10.01.2024

Dear Sir,

This is to confirm that the proposal/bid submitted by <<_____>>, is in complete agreement with the RFP/Tender and any of the corrigendum(s) or amendment(s) issued thereon and there is no deviation whatsoever.

Date:

Name & Signature of
Authorized Representative:

Company
Seal:

Name of Bidder:

Full Address:

Telephone No.:

Annexure -VII



**Mahalaxmi Branch
Mahalaxmi Chambers
22, Bhulabhai Desai Road
MUMBAI: 400 026
Tel. No. No.23512895 / 23517234 Fax No.23516948**

LT No:MAH/RCIL/2010

Date: 21/10/2010

To,
The Sr. Manager (Finance)
Railtel Corporation Of India Limited
Mahalaxmi,Mumbai

Dear Sir,

Sub:- Bank Details For your collection account.

We are in receipt of your letter no. RCIL/WR/Fin/Bank Matters dated 20.10.2010
Requesting bank details for your collection account no. 317801010036605. Details are below:-

Account No.- 317801010036605

A/c Name- Railtel WR collection A/c

Bank Name- UNION BANK OF INDIA

Branch name- Mahalaxmi, branch

Branch address- 22, bhulabhai desai Road, Mahalaxmi chambers,
Mahalaxmi, Mumbai-400026

IFSC Code- UBIN0531782

Swift Code- UBININBBLOP

Thanking You

Your's faithfully

Pushpa Tiwari
Pushpa Tiwari
Manager

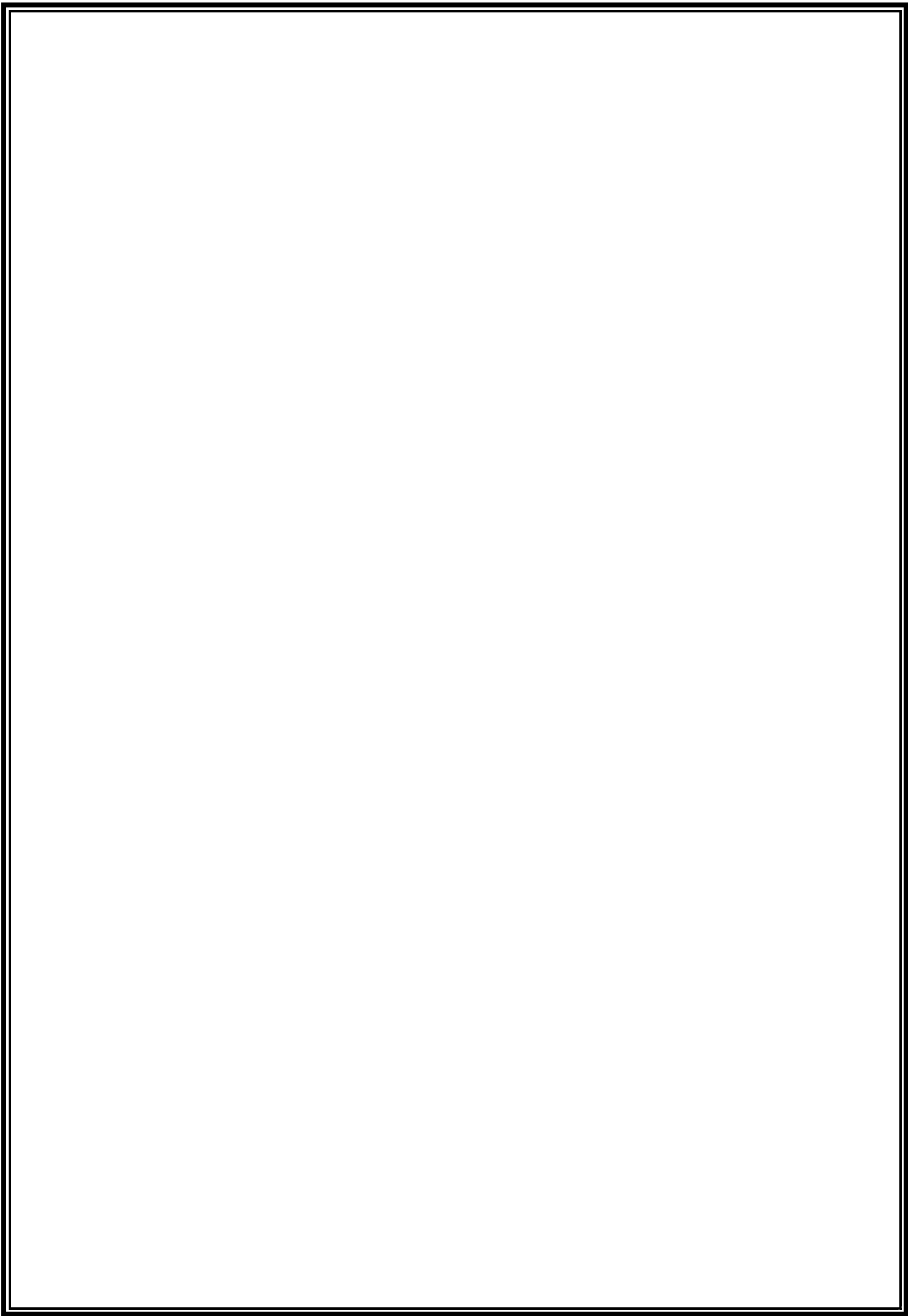


Tender Ref:- RCIL WR-BPL/MKTG(EB)/Jan.- 1/17

dated: 10.01.2024

Annexure -VIII

CC/NT/W-MISC/DOM/A06/23/11830



SECTION - I

INVITATION FOR BIDS (IFB)

INVITATION FOR BIDS (IFB)

FOR

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).

(SINGLE STAGE TWO ENVELOPE BIDDING) (Domestic Competitive Bidding under e-procurement)

Date of Issuance of IFB : 29/11/2023
Specification No. : CC/NT/W-MISC/DOM/A06/23/11830
Funding : Domestic
RFx Number: 5002003096

1.0 This invitation for bids follows the e-procurement notice (Invitation for Bids) for the subject package published on 29/11/2023 on POWERGRID's website and e-procurement portal given at para 5.0 below and on Government of India's Central Public Procurement Portal (<https://eprocure.gov.in>). Any Corrigendum and/or amendments, etc shall also be published only on the above website/portals.

2.0 Power Grid Corporation of India Ltd. (A Government of India Enterprise) incorporated under the Companies Act, 1956, having its Registered Office at B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi - 110 016 (hereinafter referred to as 'POWERGRID'/'Owner') has decided to set up, as an Owner for the following:

Establishment of State of the Art Unified Centralized Network Management System (U-NMS) for Western Region ISTS and State Utility Communication Network.

2.1 The procurement activities in respect of the aforesaid Project shall be carried out by the Owner itself and it intends to use domestic funding for eligible payments under the contract for the package as mentioned above. For the purpose of all procurement activities, the Owner shall also be referred to as 'Employer'.

3.0 POWERGRID, therefore, invites bids from eligible bidders for the following package for "**Establishment of State of the Art Unified Centralized Network Management System (U-NMS) for Western Region ISTS and State Utility Communication Network**" on Domestic Competitive Bidding basis under secured e-procurement procedure:

Package:	Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).

This Invitation for Bids extended through media, website or written communication or by any other means, and issuance of Bidding Documents shall not be construed to mean that the prospective bidders to whom the Invitation for Bids has been extended and/or Bidding Documents have been issued is deemed to be an eligible

bidder. The eligibility of the bidders shall be determined as per the provisions of Bidding Documents.

3.1 The scope of work covered under the subject Package shall includes overall Project Management having Survey, Planning, Design, Engineering, Documentation, Integration, Supply, Delivery to site, Unloading, Insurance, Storing, Handling, transportation to final locations, Installation, Termination, Testing, Demonstration for acceptance, and Commissioning of following:

- a) Supply and Installation of Main & Backup UNMS system hardware and software along with associated items at respective UNMS Centers as per specified BoQ in the TS. The new system shall be deployed in such a way that the operation of the existing systems should not be disturbed.
- b) Supply and Installation of State configuration including hardware & software for workstation, network switches, firewall & IDPS, Printer, Furniture etc.
- c) Integration of existing NMS and Network Elements (NE) with Main and Back up UNMS System. One channel of each NMS/NE to Main and Back up UNMS center shall be used for redundancy of respective UNMS Centers. The splitter required for redundant channels integration of NEs shall be in the scope of the contractor.
- d) If NBI License/NMS is not available for any NMS/NE, Bidder has to procure, at their own cost, the NBI license, NMS etc., for that particular NMS/NE, for integration in UNMS System.
- e) Development of complete Database, displays and reports either from scratch or by extracting existing database, displays and reports.
- f) Import and Adaption of database & displays made by Employer/Owner for existing NMS system including import of historical data stored in existing servers for integration in new system.
- g) Auxiliary Power Supply System Comprising of UPS with Battery set along with all necessary distribution board wherever required as per specified BoQ in TS.
- h) Integration & Testing with new EMS/NMS/NEs coming up during implementation and AMC period of this Contract.
- i) Integration & Testing with U-NMS at National level coming up during implementation and AMC period of this Contract.
- j) Technical and Commercial tie-ups with existing vendors for NMS/NEs and OEM's of UNMS modules.
- k) Supply of Spares identified under AMC along with main items to meet the contingency during installation period and during AMC period.
- l) All cabling, wiring, and interconnections to the equipments being supplied and to be integrated including communication equipment and power supply.
- m) Integration of all the supplied equipments and existing system
- n) The contractor's scope shall include customization of its database, such as configuration of database, scan period and all other database parameters required to integrate existing system successfully.
- o) Shifting of existing system workstations and Installation of new system workstations at temporary location in parallel for intervening period.
- p) Shifting and Installation of new system in UNMS Centre. This shall include all the services including cabling, interface modification and shifting or re-shifting

of system required for intervening period and for final shifting to main UNMS Centre. Re-cabling for some or all equipments as required for final shifting shall also be in the scope of supplier.

- q) Additional Hardware, software and services necessary to ensure compatibility with existing equipment.
- r) Auditing of Cyber Security implementation by CERT-In listed Auditors during AMC.
- s) Training Owner's personnel
- t) Comprehensive Maintenance of the supplied system for seven (7) years including one (1) year defect liability period as per specification including future UNMS/NMS/EMS & NE Integrations, Database configurations, Maintaining Spare inventory etc.
- u) Integration with third party Applications: The new UNMS Systems being supplied shall have provision to exchange data with the existing and or to be purchased third party applications of Employer/Owner in standard formats like ODBC, OPC & XML etc.
- v) GI/Aluminum cable trays/trace ways with covers shall be supplied by the contractor for laying cables so that cable can be protected from rodents. These cable trays/trace ways shall be screwed/ fixed on the floor by the contractor.
- w) Contractor shall supply necessary interface (Hardware and software) for sniffing/tapping the existing NMS/EMS/NEs for parallel operation of new system with existing system.

The above scope of work is indicative and the detailed scope of work is given in the Technical Specification (Volume-II) of the Bidding Documents.

- 3.2 The completion period for the subject package shall be the period as specified in ITB Sub-Clause 24.1(c).
- 3.3 Bidding will be conducted through the domestic competitive bidding procedures as per the provisions of ITB/BDS and the contract shall be executed as per the provisions of the Contract. Bidders may note that the Employer has uploaded its 'Works and Procurement Policy and Procedures' (WPPP) document alongwith its Modification/Amendment on "*Ineligibility of Firms for Participation in the Bidding Process*" and on "*Black-Listing of Firms / Banning of Business*" **and its updation** on POWERGRID's website referred to at para 5.0 below. It shall be noted that no other party, including the Bidder/Contractor, shall derive any right from this 'Works and Procurement Policy and Procedures' (WPPP) document or have any claim on the Employer on the basis of the same. The respective rights of the Employer and the Bidder/Contractor shall be governed by the Bidding Documents/Contract signed between the Employer and the Contractor for the package. The provisions of the Bidding Documents shall always prevail over that of 'Works and Procurement Policy and Procedures' (WPPP) document in case of contradiction.
- 4.0 The detailed Qualifying Requirements (QR) are given in the Bidding Document.
- 5.0 Important Instruction for participation in subject e-Tendering:

- a) Bidders are requested to read the 'Bidders Manual and Pre-Requisite Document' available on 'POWERGRID Reverse Auction and Integrated Tendering (PRANIT)' portal through website <https://etender.powergrid.in> before proceeding for submission of bids. It is important to note that bidders can submit their bids online only through <https://etender.powergrid.in>.
- b) The complete Bidding Documents including tender drawings are available at POWERGRID's website <http://www.powergrid.in> as well as on portal <https://etender.powergrid.in>. However, in case of any contradiction between the Bidding Documents at POWERGRID's website and those at the portal, the latter shall prevail. Interested bidders shall download the Bidding Documents from the portal <https://etender.powergrid.in>, as per the provisions available therein. Interested bidders can download the Bidding Documents and commence preparation of bids to gain time. From e-Tendering portal, the bidders can download the bidding documents as a 'Guest' and/or after registering, as detailed below at (6.0).

The bidding documents are meant for the exclusive purpose of bidding against this specification and shall not be transferred to any parts or reproduced or used otherwise for any purpose other than for which they are specifically uploaded.

- c) Bidders shall ensure that their bids, complete in all respects, are submitted online through POWERGRID's e-tendering portal only. **No DEVIATION in this regard is acceptable.**

6.0 Interested bidders have to necessarily register themselves on the portal <https://etender.powergrid.in>, to participate in the bidding under this invitation for bids. It shall be the sole responsibility of the interested bidders to get themselves registered at the aforesaid portal.

The said registration shall be free of cost. On completion of registration process, the registering bidders will be provided with User ID and Log-In password.

Kindly note that to submit the bids electronically, bidders must have a valid Class 3B Digital Certificate (signing and encryption / decryption certificate).

Interested bidders may obtain further information regarding this IFB from the office of Sr. General Manager (CS-G7)/ Sr. Dy. General Manager (CS-G7) / Manager (CS-G7), POWERGRID at the address given at para 11.0 below from 15:00 hours to 17:00 hours on all working days.

For proper uploading of the bids on the portal namely <https://etender.powergrid.in> (hereinafter referred to as the 'portal'), it shall be the sole responsibility of the bidders to apprise themselves adequately regarding all the relevant procedures and provisions as detailed at the portal as well as by contacting from POWERGRID, as and when required, for which contact details are mentioned above below. The Employer in no case shall be responsible for any issues related to timely or properly

uploading/submission of the bid in accordance with the relevant provisions of Section II – ITB of the Bidding Documents.

- 7.0 A online pre-bid meeting will be held on **08/12/2023** at **1130 Hrs.** (IST) to clarify the bidders various issues raised in accordance with clause 6.4 of ITB.
- 8.0 A Single Stage Two Envelope Bidding Procedure will be adopted and will proceed as detailed in the Bidding Documents.
- 8.1 Soft Copy Part of the Bids must be uploaded under Single Stage Two Envelope Bidding Procedure on the portal at or before **11:00 hours** on **03/01/2024**. The e-Procurement system would not allow any late submission of bids through the portal after due date & time as specified.

Hard Copy Part of the Bids must be submitted under Single Stage Two Envelope Bidding Procedure at the address given in BDS at or before **11:00 hours** on **05/01/2024**. In case Hard copy part of the bid is not received by the Employer till the deadline for submission of the same prescribed by the Employer, but the bidder has uploaded the soft copy part of the bid, the soft copy part of the first envelope bid uploaded on the portal shall be opened. Such bids will be rejected during preliminary examination.

First Envelope i.e. Techno -Commercial Part shall be opened on **05/01/2024** at **11:30 hours** in the presence of the bidders' representatives who choose to attend in person at the address below or may be viewed by the bidders by logging in to the portal. Second Envelope i.e. Price Part shall be opened in the presence of the bidders' representatives who choose to attend at the time and date and at the address given in the intimation for opening of Second Envelope in accordance with Clause 25 of ITB or may be viewed by the bidders by logging in to the portal.

Document Fee must be submitted either in physical form or paid online (for details refer Clause ITB 5.4). The aforesaid documents in physical form or documentary evidence of online payment of the specified amount to POWERGRID, should be submitted at the address given at para 11.0 below at or before 1100 Hrs. **05/01/2024**.

Power of Attorney, Joint Deed of Undertaking (if applicable), Joint Venture Agreement (if applicable), Integrity Pact and Safety Pact must be submitted in physical form at the address given at para **11.0** below at or before 1100 Hrs. **05/01/2024**. POWERGRID shall not be responsible for any postal delay in respect of submission of hard copy part of the bids.

- 9.0 The Employer reserves the right to conduct e-Reverse Auction (e-RA) in accordance with clause 29 of ITB.
- 10.0 POWERGRID reserves the right to cancel/withdraw this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.

11.0 All correspondence with regard to the above shall be to the following address.

(By Post/In Person)

Sr. General Manager (CS) / Sr. DGM (CS-G7)/ Manager (CS-G7)
Power Grid Corporation of India Limited
'Saudamini', 3rd Floor, Plot No.-2, Sector-29
Gurgaon (Haryana) - 122001.

(Thru Board) +91-124-282- 2397/3313/2353
Mobile: +91- 9910378008/ 9971399074/9599814162
Fax Nos.:- +91-124-2571 831

Email Address: edward@powergrid.in;
nrapendra@powergrid.in
rmendhe@powergrid.in

For more information on POWERGRID, visit our site at:
<http://www.powergrid.in>

12.0 Bidders are requested to open the following link for pre-requisite system settings of PRANIT portal and manual/video tutorial regarding information for bid submission:

https://etender.powergrid.in/new_logon2/User_Help_Menu.html

In case any technical issue remains unresolved, Bidder may contact the ERP SRM Helpdesk support as per the details below:

Phone No – 0124-2823456 / 0124-5063900 (with call hunting feature)
Timings – 9:30 am To 5:30 pm

Bidders are advised to contact the Helpdesk minimum 2 working days before Bid Submission Deadline for assistance.

Note- At the time of submission of the bid, Bidders are required to make sure that:

1. The First Envelope excel with file named “**First Envelope and Bid Forms**” must be uploaded alongwith the bid.
2. The Second Envelope excel with file named “**Price_schedule**” must be uploaded alongwith the bid.

As per the provisions of the portal, it is mandatory to upload aforesaid excel files with titled as indicated above (Bidders may refer user manuals at the portal <https://etender.powergrid.in> regarding submission of bid).

--- End of Section-I (IFB) ---

SECTION - II

INSTRUCTION TO BIDDERS (ITB)

TABLE OF CLAUSES

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INSTRUCTION TO BIDDERS (ITB)

Preamble

This section (Section-II) of the Bidding Documents provides the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the Employer. It also provides information on bid submission and uploading the bid on portal <https://etender.powergrid.in>, on line bid opening, evaluation and on contract award. This Section (Section II) contains provisions that are to be used unchanged unless Section III, which consists of provisions that supplement, amend, or specify in detail, information or requirements included in Section II and that are specific to each procurement, states otherwise. If there is a conflict between the provisions of Section - II & Section - III, the provisions of Section - III shall prevail.

However, provisions governing the performance of the Contractor, payments under the contract or matters affecting the risks, rights and obligations of the parties under the contract are not included in this section but instead under Section - IV: General Conditions of Contract and/or Section - V: Special Conditions of Contract.

Bidders may note that the Employer has uploaded its 'Works & Procurement Policy and Procedure' (Vol.-I & II) along with its Updation/Modification/Amendment¹ thereof on POWERGRID's website and in this regard, attention of the Bidder is drawn to Clause IFB 3.3, Section -I of the Bidding Documents. Those Bidders who wish to peruse the same may visit **www.powergrid.in**. However, it shall be noted that no other party, including the Bidder/Contractor, shall derive any right from this 'Works & Procurement Policy and Procedure' documents or have any claim on the Employer on the basis of the same. The respective rights of the Employer and Bidders/Contractors shall be governed by the Bidding Documents/Contracts signed between the Employer and the Contractor for the respective package(s). The provisions of Bidding Documents shall always prevail over that of 'Works & Procurement Policy and Procedure' documents in case of contradiction.

Further in all matters arising out of the provisions of this Section - II and the Section-III of the Bidding Documents, the laws of the Union of India shall be the governing laws and courts of New Delhi shall have exclusive jurisdiction.

¹ Including Amendment on "Capacity and Capability Assessment – regarding new parties undertaking erection works of Transmission Line Tower Packages", on "Ineligibility of Firms for Participation in the Bidding Process" and on "Black-Listing of Firms / Banning of Business".

A. Introduction

1. Source of Funds

- 1.1 The Owner named in the **BDS** intends to use domestic funding (Owner's Internal Resources/Domestic Borrowings/Bonds) for this Project.

All eligible payments under the contract for the package for which this Invitation for Bids is issued shall be made by the Employer named in the **BDS**.

2. Eligible Bidders

- 2.1 This Invitation for Bids, issued by the Employer is open to all firms including company(ies), Government owned Enterprises registered and incorporated in India as per Companies Act, 1956, barring Government Department as well as foreign bidders/MNCs not registered and incorporated in India and those bidders with whom business is banned by the Employer.

- 2.2 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

- (a) they have a controlling partner in common; or
- (b) they receive or have received any direct or indirect subsidy from any of them; or
- (c) they have the same legal representative for purposes of this bid; or
- (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e) a Bidder submits more than one bid in this bidding process, either individually [including bid submitted as a agent/authorised representative on behalf of one or more manufacturer(s) or through Licensee – Licensors route, wherever permitted as per the provision of Qualification Requirement for the Bidders in Annexure – A (BDS)] or as a partner in a joint venture, except for

alternative offers permitted under ITB Clause 9.3. This will result in the disqualification of all such bids. However, this does not limit the participation of a Bidder as a subcontractor in another bid, or of a firm as a subcontractor in more than one bid; or

(f) a Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Plant and Installation Services that are the subject of the bid; or

(g) A Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Employer as Project Manager for the contract.

2.3 The Bidder, directly or indirectly shall not be a dependent agency of the Employer.

2.4 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.

3. Eligible Plant, Equipment, and Services

3.1 For the purposes of these Bidding Documents, the words “facilities,” “plant and equipment,” “installation services,” etc., shall be construed in accordance with the respective definitions given to them in the General Conditions of Contract.

3.2 All plant and equipment to be supplied and installed and services carried out under the contract shall have their origin in any country barring those countries against whom sanction for conducting business is imposed by Government of India and barring those firms with whom business is banned by the Employer.

3.3 For purposes of this clause, “origin” means the place where the plant and equipment or component parts thereof are mined, grown, or produced. Plant and equipment are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

3.4 The origin of the plant, equipment, and services is distinct from the nationality of the Bidder.

4. Cost of Bidding

- 4.1 The Bidder shall bear all costs associated with the preparation and submission of its bid including post-bid discussions, technical and other presentations etc., and the Employer will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.
- 4.2 The bidder has to ensure his registration with POWERGRID on the portal <https://etender.powergrid.in>. The said registration shall be Free of Cost.

B. The Bidding Documents

5. Content of Bidding Documents

- 5.1 The facilities required, bidding procedures, contract terms and technical requirements are prescribed in the Bidding Documents. The Bidding Documents comprise of the following and shall include amendments, if any, thereto:

VOLUME – I: Conditions of Contract

- Section I Invitation for Bids (IFB)
- Section II Instructions to Bidders (ITB)
- Section III Bid Data Sheet (BDS)
- Section IV General Conditions of Contract (GCC)
- Section V Special Conditions of Contract (SCC)
- Section VI Sample Forms and Procedures (FP)
 - 1. Bid Form & Price Schedule
 - 1.1 Bid Form
 - 1.2 Price Schedule
 - 2. Bid Security Form
 - 3. Form of Notification by the Employer to the Bank
 - 4. Form of 'Notification of Award of Contract'
 - 4(a) Form of 'Notification of Award of Contract' for Supply of Plant and equipment
 - 4(b) Form of 'Notification of Award of Contract' for Installation of Plant and equipment
 - 5. Form of Contract Agreement
 - 5.1 Appendix-1: Terms and Procedures of Payment
 - 5.2 Appendix-2: Price Adjustment
 - 5.3 Appendix-3: Insurance Requirements
 - 5.4 Appendix-4: Time Schedule
 - 5.5 Appendix-5: List of Approved Subcontractors
 - 5.6 Appendix-6: Scope of Works and Supply by the Employer

- 5.7 Appendix-7: List of Document for Approval or Review
- 5.8 Appendix-8(a): Guarantees, Liquidated Damages for Non-Performance
Appendix-8(b): Functional Guarantees
- 5.9 Appendix-9: Contract Co-ordination Procedure
- 5.10 Appendix-10: Break-up of Contract Price for On-Account Payment Purpose
- 5.11 Integrity Pact
- 5.12 Safety Pact
6. Performance Security Form
7. Bank Guarantee Form for Advance Payment
8. Form of Taking Over Certificate
9. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in one lot by Employer for performance of its contract.
10. Form of Indemnity Bond to be executed by the Contractor for the Equipment handed over in installments by Employer for performance of its contract.
11. Form of Authorisation Letter
12. Form of Trust Receipt for Plant, Equipment and Materials received
13. Form of Extension of Bank Guarantee
14. Form of Power of Attorney for Joint Venture
15. Form of Joint Venture Agreement
16. Format for Evidence of Access to or Availability of Credit/ Facilities
17. Form of Operational Acceptance
18. Form of Safety Plan to be submitted by the Contractor within thirty days of award of contract.
19. Form for Information to be furnished by the Contractor in respect of the Procurement made from MSE Vendors

Volume-II: Technical Specification

Volume-III: Bid Form, Price Schedules & Technical Data Sheets

- 5.2 The Bidder is expected to examine all instructions, forms, terms, specifications and other information in the Bidding Documents. Failure to furnish all information required by the Bidding Documents or submission of a bid not substantially responsive to the Bidding

Documents in every respect will be at the Bidder's risk and may result in rejection of its bid.

- 5.3 Scope of Work is given in Volume-II of Bidding Documents titled "Technical Specifications".

Utmost care has been taken by the Employer in formulating the programmed Attachments and Price Schedules. Bidders are expected to thoroughly verify with trial run at their end and notify to the Employer Arithmetical, Logical, Formatting or any such error, if found in the same for suitable action. Irrespective of corrections made in this regard through amendment(s), if any, rectification of error for evaluation shall be carried out in accordance with stipulated provisions of Bidding Documents.

- 5.4 All the Bidders except those exempted pursuant to ITB Sub-Clause 5.5 shall submit along with the hard copy part of bid a nonrefundable fee as stipulated in the BDS towards the cost of Bidding Documents in the form of demand draft in favour of Power Grid Corporation of India Ltd., payable at New Delhi/Gurgaon.

Alternatively, the nonrefundable fee towards the cost of Bidding documents can be submitted as online payment through POWERGRID ONLINE PAYMENT UTILITY - <https://epay.powergrid.in>, a link of which is provided on the POWERGRID website www.powergrid.in. While making such online payment, the bidder shall choose Segment as "Suppliers" and fill in details as follows:

Payment Category	Tender fee
Sub-category	Tender fee payment-CC#
Name of Depositor	Name of the Bidder (<i>name of the Sole bidder or name of Lead partner of the Joint Venture (on behalf of the Joint Venture) in case of Joint Venture bids</i>)
Vendor Code, if applicable	POWERGRID vendor code of the bidder, if existing (<i>vendor code of the Sole bidder or the lead partner of the Joint Venture</i>)
Payment Remarks	Tender fee for [enter the name of the package]

The copy of 'Online Payment Acknowledgement – Suppliers' generated subsequent to the payment shall be submitted along with hard copy part of the bid. The online payment facility shall be for payment in Indian Rupees only.

Bidder's failure to submit nonrefundable fee towards the cost of Bidding Documents in the form of an acceptable Demand Draft along with the bid or an online payment through POWERGRID ONLINE PAYMENT UTILITY or subsequently pursuant to ITB Clause 21.1, except as exempted in ITB Sub-Clause 5.5 below, shall lead to outright rejection of the Bid.

- 5.5 Micro and Small Enterprises (MSEs) registered with Udyam Registration Portal as specified by Ministry of Micro, Small and Medium Enterprises are exempted from submission of fee towards the cost of Bidding Documents as per the Provisions of the Public Procurement Policy for Micro and Small Enterprises (MSEs) order 2012, Notification dated 01/06/2020 and 26/06/2020 read in conjunction with related notifications issued from time to time for such enterprises. This shall be subject to submission of 'Udyam Registration Certificate' with regard to registration with authority mentioned above in accordance with the relevant notifications/orders.

In case of bid submitted by a Joint Venture of two or more firms as partners, if allowed as per stipulated Qualification Requirements in Annexure-A (BDS), all partners of the joint venture shall be MSEs to consider its bid as bid from MSE. Further, JV bidder with at least one non-MSE partner (whether lead or other partner) shall not be eligible for the benefit available to the MSE bidders.

6. Clarification of Bidding Documents; and Pre-Bid Meeting

- 6.1 Prospective bidder may ~~also~~ seek clarification in writing or by cable (hereinafter, the term cable is deemed to include Electronic Data Interchange (EDI) or telefax) at the Employer's mailing address indicated in the **BDS**. Similarly, if a Bidder feels that any important provision in the documents, such as those listed in ITB Sub-Clause 22.3.1, will be unacceptable, such an issue should be raised as above. The Employer will respond through the portal <https://etender.powergrid.in> to any request for clarification or modification of the Bidding Documents that it receives no later than twenty-eight (28) days (unless otherwise specified in **BDS**) prior to the original deadline for submission of bids prescribed by the Employer. The Employer shall not be obliged to respond to any request for

clarification received later than the above period. Further, the mere request for clarification from the Bidders shall not be a ground for seeking extension in the deadline for submission of bids. Employer's response (including an explanation of the query but not identification of its source) will be uploaded on portal <https://etender.powergrid.in> where all the bidders can see clarification/reply to query.

- 6.2 The Bidder is advised to visit and examine the site where the facilities are to be installed and its surroundings and obtain for itself on its own responsibility and cost all information that may be necessary for preparing the bid and entering into a contract for supply and installation of the facilities. The costs of visiting the site shall be at the Bidder's own expense.
- 6.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the Bidder, its personnel and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of the inspection.
- 6.4 The Bidder's designated representative(s) is/are invited to attend a pre-bid meeting, which, if convened, will take place at the venue and time stipulated in the **BDS**. The purpose of the meeting will be to clarify any issues regarding the e-procurement method, the Bidding Documents in general and the Technical Specifications in particular. The Bidder is requested, as far as possible, to submit any question in writing, to reach the Employer not later than one week before the meeting. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted as indicated hereafter. Minutes of the meeting, including the text of the questions raised (without identifying name of the bidders) and the responses given, together with any responses prepared after the meeting, will be transmitted without delay through the e-procurement portal only. Any modification of the Bidding Documents listed in ITB Sub-Clause 5.1, which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to ITB Clause 7 and not through the minutes of the pre-bid meeting.

Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

7. Amendment of Bidding Documents

- 7.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at its own initiative, or in response to a clarification requested by a prospective Bidder, amend the Bidding Documents.
- 7.2 The amendment will be notified only through the portal <https://etender.powergrid.in>. The communication/alert regarding the notification of amendment shall also be sent by the portal directly to all the prospective bidders who have logged in with their user id and password (user credentials) and **have registered against the subject package(s) by clicking available button named "REGISTER"**. The amendments to the Bidding Documents will be binding on the bidders and the notification of the amendment through portal, sent to the prospective bidders, shall be deemed to be construed that such amendment(s), to the Bidding Documents have been taken into account by the Bidder in its bid.
- 7.3 In order to afford reasonable time to the prospective Bidders to take the amendment into account in preparing their bid, the Employer may, at its discretion, extend the deadline for the submission of bids, in which case, the Employer will notify through portal <https://etender.powergrid.in> where all prospective bidders may see the extended deadline.

C. Preparation of Bids

8. Language of Bid

- 8.1 The bid prepared by the Bidder and all correspondence and documents exchanged by the Bidder and the Employer related to the bid shall be written in the English language, provided that any printed literature furnished by the Bidder may be written in another language, as long as such literature is accompanied by English translation of its pertinent passages, in which case, for purposes of interpretation of the bid, the English translation shall govern.

9. Documents Comprising the Bid

I. Hard Copy Part

Hard copy part of the bid shall comprise of following documents to be submitted in sealed envelope, as part of First Envelope.

- (i) DD or Online Payment Acknowledgement towards Bidding Document fee of the amount as specified in the in accordance

with clause 5.4 of ITB or documentary evidence in support of exemption of Bidding Document fee as per ITB 5.5

- (ii) Bid Security (in Original) or Online Payment Acknowledgement towards Bid Security or documentary evidence in support of exemption of Bid Security, in separate envelope in accordance with clause 13 of ITB, Section-II.
- (iii) Integrity Pact (in Original) in accordance with clause 9.3 (o) of ITB, Section-II in separate envelope
- (iv) Power of Attorney as per Clause 9.3 (b).
- (v) In case of Bid from Joint Venture, the Joint Venture Agreement & Power of Attorney of Joint Venture Agreement, both in original
- (vi) Safety Pact (in Original) in accordance with clause 9.3 (s) of ITB, Section-II in separate envelope
- (vii) Bidders shall also submit Joint Deed of Undertaking by the collaborator along with the bidder/manufacturer, duly signed and stamped on each page in original, if applicable as per Annexure- A (BDS); and
- (viii) Any other document further specified in the BDS duly signed and stamped on each page.**

Bidder shall note that no document is required to be submitted as part of Second envelope in Hard Copy.

II. Soft Copy Part

Soft copy part of the bid shall comprise of following documents to be uploaded on the portal as per provisions therein.

- (a) As part of First Envelope
 - (i) The Electronic Form/Template of the bid for First Envelope (Techno-Commercial), as available on the portal, shall be duly filled.
 - (ii) Programmed file - Attachments (Attachment to Bid Form including attachment to QR) in MS Excel format & its revision covering various attachments, Integrity Pact and bid form for first envelope.
 - (iii) Scanned copies of all the documents mentioned at 15.4 of ITB
- (b) As part of Second Envelope
 - (i) The Electronic Form/Template of the bid for Second Envelope (Price - Part) covering details regarding summary of price details.

- (ii) Price Schedules & Bid Forms in MS excel format & its revision covering various price schedules and bid forms for Second Envelope.

9.1 The bid shall be submitted by the Bidder under “Single Stage – Two Envelope” procedure of bidding. Under this procedure, the bid submitted by the Bidder in two envelopes - First Envelope (also referred to as Techno - Commercial Part) and Second Envelope (also referred to as Price Part) shall comprise of the following documents:

First Envelope:

- (a) Bid Form (First Envelope) duly completed and signed by the Bidder, together with all Attachments & Technical Data Sheets (available in Volume-III) as uploaded on the portal <https://etender.powergrid.in> and identified in ITB Sub-Clause 9.3 below.
- (b) Hard copy of the following documents submitted at the address mentioned at 1.1 above:
 - i) DD or Online Payment Acknowledgement towards Bidding Document fee of the amount as specified in the in accordance with clause 5.4 of ITB or documentary evidence in support of exemption of Bidding Document fee as per ITB 5.5;
 - ii) Bid Security (in Original) or Online Payment Acknowledgement towards Bid Security or documentary evidence in support of exemption of Bid Security, in separate envelope in accordance with clause 13 of ITB, Section-II;
 - iii) Integrity Pact (in Original) in accordance with clause 9.3 (o) of ITB, Section-II in separate envelope;
 - iv) Power of Attorney as per Clause 9.3 (b);
 - v) In case of Bid from Joint Venture, the Joint Venture Agreement & Power of Attorney of Joint Venture Agreement
 - vi) Safety Pact (in Original) in accordance with clause 9.3 (s) of ITB, Section-II in separate envelope
 - vii) Any other document further specified in the **BDS** duly signed and stamped on each page.

Second Envelope:

- (a) Bid Form (Second Envelope) together with Price Schedules (available in Volume-III), duly completed as uploaded on the portal <https://etender.powergrid.in>.

9.2 Bidders shall note that, if permitted according to the **BDS**, they are entitled to submit an alternative bid within the scope specified in the Technical Specification. In such cases, bidders shall submit full details and justifications, etc., in Attachment 7 to the bid as indicated in ITB Sub-Clause 9.3 (h) below.

9.3 Bidder shall submit soft copy of following documents by uploading on the portal <https://etender.powergrid.in> and Hard copy of documents wherever stipulated in the manner specified in ITB Clause 9.1 above along with its Techno - Commercial Part (First Envelope):

- (a) Attachment 1: Bid Security or Online Payment Acknowledgement towards Bid Security (if required) or documentary evidence in support of exemption of Bid Security (*submission of Hard Copy in 'Original' for Bid Security and in 'Copy' for documentary proof in support of exemption*)

A bid security or Online Payment Acknowledgement towards Bid Security or documentary evidence in support of exemption of Bid Security, in sealed separate envelope shall be furnished in accordance with ITB Clause 13 & ITB Clause 16.

Bidder shall submit the hard copy of the Bid Security in original or a copy of Online Payment Acknowledgement towards Bid Security or copy documentary evidence in support of exemption of Bid Security.

- (b) Attachment 2: Power of Attorney (*submission of Hard copy in 'Original' and uploading of Scanned Copy*)

A power of attorney, duly notarized, indicating that the person(s) signing the bid has(ve) the authority to sign the bid and thus that the bid is binding upon the Bidder during full period of its validity, in accordance with ITB Clause 14.

Scanned copy of above documents shall be uploaded. (refer para 15.4 below)

- (c) Attachment 3: Bidder's Eligibility and Qualifications (*Uploading of Scanned Copies of documentary evidence in support of Bidder's qualification. In case of Joint Venture bid, submission of Hard Copy in 'Original' of the JV Agreement and POA for JV*)

In the absence of prequalification, documentary evidence establishing that the Bidder is eligible to bid in accordance with

ITB Clause 2 and is qualified to perform the contract in accordance with **Annexure – A (BDS)**, if its bid is accepted.

The documentary evidence of the Bidder's eligibility to bid shall establish to the Employer's satisfaction that the Bidder, at the time of submission of its bid, is eligible as defined in ITB Clause 2.

The documentary evidence of the Bidder's qualifications to perform the contract, if its bid is accepted, shall establish to the Employer's satisfaction that the Bidder has the financial, technical, production, procurement, shipping, installation and other capabilities necessary to perform the contract, and, in particular, meets the experience and other criteria outlined in the Qualification Requirement for the Bidders in Annexure – A (BDS) and shall also include:

The documentary evidence defining i) the constitution or legal status; (ii) The principal place of business; (iii) The place of incorporation (for bidders who are corporations); or the place of registration and the nationality of the Owners (for applicants who are partnerships or individually-owned firms); (iv) In support of meeting the Technical experience, self-certified copy of Contract/ Award Letter and Utility Certificate.

The bidder shall furnish along with its bid a declaration as per the enclosed format from its Power of Attorney holder and Key Managerial Personnel (KMP) of the company i.e. CEO/Managing Director/ Company Secretary/ Director/ CFO/any of the partner in case of partnership firm/ any other officer entrusted with substantial powers of the management of the affairs of the company/firm, declaring the eligibility/qualification data to be true and correct.

Declaration for anticipated change in legal structure/ ownership, if any.

The complete annual reports together with Audited statement of accounts of the company for last five years of its own (separate) immediately preceding the date of submission of bid. The Bidder shall also furnish documentary evidence/ declaration regarding Financial re-structuring of the company, if any.

If the opening of the bids pursuant to ITB Clause 20.1 or the ascertainment of qualification pursuant to ITB Clause 23.1 is

carried out after 30th September, the bidder shall be required to submit the complete annual reports together with Audited statement of accounts of the company for the immediately preceding Financial Year except in cases where the Board of the Company/ Registrar of Companies has granted extension of time for finalization of accounts, for which the bidder has to submit requisite documentary evidence. In case of Bidder's failure to submit the same along with the Bid or subsequently pursuant to ITB Sub-clause 21.1, the Bid shall be rejected.

Scanned copy of above documents shall be uploaded (refer para 15.4 below).

However, if the bidder resorts to unethical practices inter-alia including misrepresentation of facts, submission of false and/or forged details/ documents/ declaration as above, the bidder may be debarred from the participation in Employer's tenders for a period of 1 to 3 years, as considered appropriate and its Bid Security/ Contract Performance Guarantee shall be forfeited besides taking other actions as deemed appropriate.

[**Note I.** In the event the Bidder is not able to furnish the above information of its own (i.e., separate), being a subsidiary company and its accounts are being consolidated with its Group/ Holding/ Parent company, the Bidder should submit the audited balance sheet, income statement, other information pertaining to it only (not of its Group/Holding/Parent company) duly certified by any one of the authority [(i) Statutory Auditor of the Bidder/(ii) Company Secretary of the Bidder a (iii) A certified Public Accountant] certifying that such information/documents are based on the audited accounts as the case may be.

Note II. Similarly, if the Bidder happens to be a Group/Holding/ Parent company, the Bidder should submit the above documents/information of its own (i.e., exclusive of its subsidiaries) duly certified by any one of the authority mentioned in Note I above certifying that these information/documents are based on audited accounts, as the case may be.]

Unless otherwise mentioned in **BDS**, bids submitted by a joint venture of two or more firms as partners, if allowed as per stipulated Qualification Requirements in Annexure-A (BDS), shall comply with the following requirements:

- (i) The bid shall include all the information required for Attachment 3 as described above for each joint venture partner.
- (ii) The bid shall be signed so as to be legally binding on all partners.
- (iii) One of the partners responsible for performing a key component of the contract shall be designated as leader; this authorization shall be evidenced by submitting with the bid a power of attorney signed by legally authorized signatories as per Form-14 of Section-VI.
- (iv) The leader shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture, and the entire execution of the contract, including payment, shall be done exclusively with the leader, provided otherwise requested by the joint venture and agreed between the Employer and the leader.
- (v) All partners of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with the contract terms.
- (vi) A copy of the agreement entered into by the joint venture partners shall be submitted with the bid as per Form-15 of Section-VI, including interalia delineation of responsibilities and obligations of each partners appended thereto, notwithstanding the joint and several liability.
- (vii) The joint venture agreement should indicate precisely the responsibility of all members of JV in respect of planning, design, manufacturing, supply, installation, commissioning and training. All members of JV should have active participation in execution during the currency of the contract. This should not be varied/modified subsequently without prior approval of the Employer; and

In order for a joint venture to qualify, each of its partners or combination of partners must meet the minimum criteria listed in the Qualification Requirement for the Bidder in enclosed **Annexure-A (BDS)** for an individual Bidder for the component of the contract they are designated to perform. Failure to comply with this requirement will result in rejection of the joint venture bid.

A firm can be a partner in only one joint venture; bids submitted by joint ventures or consortia including the same firm as partner will be rejected.

In the case of a Bidder who offers to supply and/or install plant and equipment under the contract that the Bidder did not manufacture or otherwise produce and/or install, the Bidder shall (i) have the financial and other capabilities necessary to perform the contract; (ii) have been duly authorized by the manufacturer or producer of the related plant and equipment or component as per proforma in attachment 8 to supply and/or install that item in the Employer's country; and (iii) be responsible for ensuring that the manufacturer or producer complies with the requirements of ITB Sub-Clause 3.2 and meets the minimum criteria listed for an individual Bidder for that item.

(d) Attachment 4: Eligibility and Conformity of the Facilities
(uploading of Scanned Copy)

Documentary evidence established in accordance with ITB Clause 3 that the facilities offered by the Bidder in its bid or in any alternative bid (if permitted pursuant to ITB Sub-Clause 9.2) are eligible and conform to the Bidding Documents.

The documentary evidence of the eligibility of the facilities shall consist of a statement on the country of origin of the plant and equipment offered, which shall be confirmed by a certificate of origin issued at the time of shipment.

The documentary evidence of the conformity of the facilities to the Bidding Documents may be in the form of literature, drawings and data, and shall furnish:

- (i) a detailed description of the essential technical and performance characteristics of the facilities;
- (ii) a list giving full particulars, including available sources, of all spare parts, special tools, etc., necessary for the proper and continuing functioning of the facilities for a period of Fifteen (15) years following completion of facilities in accordance with provisions of contract; and
- (iii) a commentary on the Employer's Technical Specifications and adequate evidence demonstrating the substantial responsiveness of the facilities to those specifications. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Documents are intended to be descriptive (establishing standards of quality and performance) only and not restrictive. The Bidder may substitute alternative

standards, brand names and/or catalog numbers in its bid, provided that it demonstrates to the Employer's satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Technical Specifications.

- (iv) All details regarding after sale service support offered.
- (v) All details regarding proposed training for Employer's personnel.
- (vi) Detailed answers to all the Questions in the Questionnaire, if prescribed in the Bidding Document.
- (vii) Details establishing the responsiveness of the offer in accordance with Technical Specification, Volume-II.

(e) Attachment 5: Subcontractors Proposed by the Bidder

The Bidder shall include in its bid details of all major items of supply or services i.e. items, whose price is more than 10% of the Bid Price, that it proposes to purchase or sublet, and shall give details of the name and nationality of the proposed Subcontractor, including vendors, for each of those items. Bidders are free to list more than one Subcontractor against each item of the facilities. Their participation should be confirmed with a letter of intent between the parties, as needed, in Attachment 8. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.

The Bidder shall be responsible for ensuring that any Subcontractor proposed complies with the requirements of ITB Clause 2, and that any plant, equipment or services to be provided by the Subcontractor comply with the requirements of ITB Clause 3 and Qualification Requirement for the Bidder, enclosed as **Annexure-A (BDS)** and Qualification Requirement for subcontractors or Sub-vendors given in Technical Specification, Volume-II.

The Employer reserves the right to delete any proposed Subcontractor from the list prior to award of contract, and after discussion between the Employer and the Contractor, the corresponding Appendix to the form of Contract Agreement shall be completed, listing the approved Subcontractors for each item concerned.

Scanned copy of above documents shall be uploaded (refer para 15.4 below).

- (f) Attachment 5A: (Items, Components, Raw Material, Services proposed to be sourced from Micro and Small Enterprises)

The Employer encourages the Contractor to source items, components, raw material, services from Micro and Small Enterprises for development of the Micro and Small Enterprises

The bidder shall furnish the details of the items, components, raw material, services which they propose to buy/avail from Micro and Small Enterprises for the purpose of completion of works.

- (g) Attachment 6: Deviations

In order to facilitate evaluation of bids, deviations, if any, from the terms and conditions or Technical Specifications shall be listed in Attachment 6 to the bid. The Bidder is required to provide the cost of withdrawal for such deviations. However, the attention of the bidders is drawn to the provisions of ITB Sub-Clause 22.3 regarding the rejection of bids that are not substantially responsive to the requirements of the Bidding Documents.

Bidder's attention is also drawn to the provisions of ITB Sub-Clause 22.3.1.

- (h) Attachment 7: Alternative Bids

- (i) Bid with alternative time schedule is not acceptable.
- (ii) Except as provided under subparagraph (iii) below, bidders wishing to offer technical alternatives to the requirements of the Bidding Documents must first price the Employer's design of the facilities as described in the Bidding Documents, and shall further provide all information necessary for a complete evaluation of the alternatives by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed installation methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer.
- (iii) When bidders are permitted pursuant to ITB Sub-Clause 9.2 to submit alternative technical solutions for specified parts of the facilities, such parts shall be described in Technical

Specifications and Drawings. Technical alternatives that comply with the performance and technical criteria specified for the facilities shall be considered by the Employer on their own merits, pursuant to ITB Sub-Clause 24.2.

- (i) Attachment 8: Manufacturer's Authorisation Form

Scanned copy of above documents shall be uploaded (refer para 15.4 below)
- (j) Attachment 9: Work Completion Schedule.
Attach Bar Chart for Work Completion Schedule

Scanned copy of above documents shall be uploaded (refer para 15.4 below)
- (k) Attachment 10: Guarantee Declaration.
Scanned copy of above documents shall be uploaded (refer para 15.4 below)
- (l) Attachment 11: Information regarding ex-employees of Employer in Bidder's firm.
- (m) Attachment 12: Price Adjustment Data
- (n) Attachment 13: Declaration regarding Social Accountability
- (o) Attachment 14: Integrity Pact (*submission of Hard Copy in 'Original'*)

The Bidder shall complete the accompanying Integrity Pact, which shall be applicable for bidding as well as contract execution, duly signed on each page by the person signing the bid and shall be returned by the Bidder in two (2) originals alongwith the Techno - Commercial Part in a separate envelope, duly superscripted with 'Integrity Pact'. The Bidder shall submit the Integrity Pact on a non judicial stamp paper of Rs. 100/-.

The required Integrity Pact is automatically generated as Attachment 14-Integrity Pact in the file Attachment (in Excel format). Bidders shall take print out in two copies discussed above and as explained in the Attachment 14-Integrity Pact.

If the Bidder is a partnership firm or a consortium, the Integrity Pact shall be signed by all the partners or consortium members.

Bidder's failure to submit the Integrity Pact duly signed in Original alongwith the Bid or subsequently pursuant to ITB Sub-Clause 21 .1 shall lead to outright rejection of the Bid.

- (p) Attachment 15: Option for Initial Advance (either Interest Bearing Initial Advance or No Initial Advance) and Information for E-payment, PF details and declaration regarding Micro/Small & Medium Enterprises

Scanned copy of Sample Cheque (Cancelled) shall also be uploaded (refer para 15.4 below).

In this Attachment, the Bidder is required to clearly mention whether the Bidder would opt for Interest bearing initial advance in addition to providing the other information as above.

- (q) Attachment 16: Additional Information (*uploading of Scanned Copy, as applicable*)
- (i) Certificate from their Banker(s) (as per prescribed formats in Form 16, Section-VI: Sample Forms and Procedures) indicating various fund based/non fund based limits sanctioned to the Bidder and the extent of utilization as on date. Such certificate should have been issued not earlier than three months prior to the date of bid opening. Wherever necessary the Employer may make queries with the Bidders' Bankers.
 - (ii) Detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder or any partner of JV may result in rejection of Bid.
 - (iii) Details of Provident Fund Code Number of the Bidder.
 - (iv) Any other information which the Bidder intends to furnish.
 - (v) Detailed information regarding previous transgressions of Integrity Pact that occurred in the last 10 years with any

other Public Sector Undertaking or Government Department or any other Company, in any country.

Scanned copy of above documents shall be uploaded (refer para 15.4 below).

- (r) Attachment 17: Declaration for tax exemptions, reductions, allowances or benefits
- (s) Attachment 18: Safety Pact (*submission of Hard Copy in 'Original'*)

The Bidder shall complete the accompanying Safety Pact, which shall be applicable for bidding as well as contract execution, duly signed on each page by the person signing the bid and shall be submitted by the Bidder in two (2) originals along with the Techno - Commercial Part in a separate envelope, duly superscripted with 'Safety Pact'. The Bidder shall submit the Safety Pact on a non judicial stamp paper of Rs. 100/-.

Bidders shall take print out in two copies discussed above and as explained in the Attachment 18- Safety Pact.

If the Bidder is a partnership firm or a consortium, the Safety Pact shall be signed by all the partners or consortium members.

Bidder's failure to submit the Safety Pact duly signed in Original along with the Bid or subsequently pursuant to ITB Sub-Clause 21.1 shall lead to outright rejection of the Bid.

- (t) Attachment 19: Declaration
- (u) Attachment -20: Declaration of Key Managerial Person jointly with Power of Attorney holder

10. Bid Form and Price Schedules

- 10.1 The Bidder shall complete the Bid Form(s) and the appropriate Price Schedules furnished in the Bidding Documents as indicated therein, following the requirements of ITB Clauses 11 and 12.

11. Bid Prices

- 11.1 Unless otherwise specified in the Technical Specifications, bidders shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the Bidding

Documents in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the facilities including supply of mandatory spares (if any). This includes all requirements under the Contractor's responsibilities for testing, precommissioning and commissioning of the facilities and, where so required by the Bidding Documents, the acquisition of all permits, approvals and licenses, etc.; the operation, maintenance and training services and such other items and services as may be specified in the Bidding Documents, all in accordance with the requirements of the General Conditions of Contract. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the prices for other items.

11.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the Bidding Documents. If a Bidder wishes to make a deviation, such deviation shall be listed in Attachment 6 of its bid. The Bidder is required to provide the cost of withdrawal for such deviations.

11.3 Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules. Where no Price Schedules are included in the Bidding Documents, Bidders shall present their prices in the following manner:

Separate numbered Schedules shall be used for each of the following elements. The total amount from each Schedule 1 to 5 shall be summarized in a grand summary of Price Proposal (Schedule 6) giving the total bid price(s) to be entered in the Bid Form.

Schedule 1 Plant and Equipment (including mandatory Spares) to be supplied including Type Test Charges

Schedule 2 Local Transportation, In-transit insurance, loading and unloading.

Schedule 3 Installation Services

Schedule 4 Charges for Training to be imparted

Schedule 5 Taxes and Duties not included in Schedule 1 to 4

Schedule 6 Grand Summary (Schedule Nos. 1 to 5)

Schedule 7 Break-up of Type Test Charges

Bidders shall note that the plant and equipment included in Schedule No. 1 above exclude materials used for civil, building and other construction works. All such materials shall be included and priced under Schedule No. 3, Installation Services.

- 11.3.1 The bid price for the items for which quantities have been estimated by the Employer shall be governed based on the unit price quoted by the bidder.
- 11.3.2 The bid price for which the quantities are to be estimated by the Bidder shall remain constant unless there is change made in the Scope of Work by Employer. The quantities and unit prices (i) subsequently arrived while approving the Bill of Quantities (BOQ) /Billing breakup of lumpsum quantities/lot/Set and/or (ii) estimated by the bidder shall be for on account payment purpose only. In case additional quantities, over and above the quantities BOQ/billing breakup and /or estimated by the bidder, are required for successful completion of the scope of work as per Technical Specification, the Bidder shall execute additional quantities of these items for which no additional payment shall be made over and above the lumpsum bid price. In case quantities of these items supplied at site are in excess of that required for successful completion of scope of work, such additional quantities shall be the property of the bidders and they shall be allowed to take back the same from the site for which no deduction from the lumpsum bid price shall be made. Further, in case actual requirement of quantities for successful completion of scope of work is less than the quantities identified in the approved BOQ /billing breakup and/or estimated by the bidder, the lumpsum bid price shall remain unchanged and no deduction shall be made from the lumpsum price due to such reduction of quantities.

HSN/SAC has not been indicated for lumpsum quantities/lot/Set as each of these consists of many items for which billing break up shall be furnished during contract execution. For the purpose of evaluation, the bidder has to indicate the rate of GST applicable on these items. As it is possible that the incidence of GST on each of these items may be different, provision has been made in the price schedules for quoting the bid price in different categories based on the incidence of GST. The bidder shall accordingly quote price in different tax categories. HSN /SAC for these items shall be furnished along with billing breakup prior to payment for these items. Employer's liability for reimbursement of GST shall be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.

11.3.3 It shall be the responsibility of the bidders to pay all statutory taxes, duties and levies (including GST) and interest, if applicable on account of additional revised invoice issued for actual material supplied, to the concerned authorities for such return/supply of surplus material, which would otherwise have been, lawfully payable. The bidders shall submit an indemnity bond to keep Employer harmless from any liability, before release of such material to the bidder by Employer.

11.3.4 Set/Lot/Lumpsum shall be governed as per the requirement of the corresponding item description read in conjunction with relevant provisions of Technical Specifications.

11.4 In the schedules, Bidder shall give the required details and a breakdown of their price considering and taking into account the Input Tax Credit (ITC) as may be available under the Goods and Services Tax (GST) Laws and Regulations, in the schedules as follows:

- (a) Plant and equipment including mandatory spares, shall be quoted on an EXW (ex-factory, ex-works, ex-warehouse or off-the-self, as applicable) basis and Type Test Charges (including the Type Test to be conducted abroad in case of an Indian Bidder), shall also be quoted in Schedule 1.

Further, in case of imported Equipments/items offered as 'Off the Shelf' or dispatched directly from the Indian Port of disembarkation, the price of such Equipments/items shall be inclusive of all cost as well as any duties paid/payable in relation to import of such goods (viz., customs duties, GST & levies etc.) considering and taking into account the ITC as may be available under the applicable laws including GST.

The price quoted in respect of all items in the above schedule shall be excluding GST applicable on transaction between the Employer and the Contractor.

- (b) Local/inland transportation, In-transit insurance, loading and unloading of the Plant and Equipment including mandatory spares to be supplied shall be quoted separately in Schedule 2, as composite supply of services, with local/inland transportation being the Principal Supply. It is the Employer's understanding that as per extant provisions, on the charges for supply of services related to Inland transportation, In-transit insurance, loading and unloading by the Bidder to the Employer, GST is not payable. The Bidder is, however, advised to check the position from their own sources. If payable, the same shall be to the

Bidder's account and Employer shall not reimburse any GST on this account.

- (c) Installation Charges shall be quoted separately (Schedule 3) and shall include rates and prices for all labour, Contractor's equipment, temporary works, materials, consumables and all matters and things of whatsoever nature, provision of operations and maintenance manuals, etc. wherever identified in the Bidding Documents as necessary for the proper execution of all installation services except those priced in other Schedules. The price quoted in respect of all items in the above schedule shall be excluding GST.
- (e) The Training Charges shall be furnished separately in Schedule-4 for the training. The price quoted in respect of all items in the above schedule shall be excluding GST.
- (f) The break-up of Type test charges shall be furnished separately in Schedule 7. The price indicated in respect of all items in the above schedule shall be excluding GST. Type test shall be considered an incidental expense incurred prior to the delivery of Equipment/item and would be added to the value of goods for GST purposes and rate of GST shall be quoted accordingly.
- (g) To facilitate the bidders, Employer has indicated an HSN/SAC code and rate of GST against each item in the Price Schedule except for lumpsum quantities/lot/Set as mentioned at ITB 11.3.3. It shall entirely be the responsibility of the bidder to check the HSN/SAC code and rate of GST given against each item. The bidder may either confirm the HSN and rate of GST or if the bidder opts to classify the item in question under a different HSN/SAC code or opts to indicate a different rate of GST, bidder may indicate the same in the columns provided. The bidders shall solely be responsible for HSN/SAC classification and the rate of GST for each item. Employer's liability for reimbursement of GST shall be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.
- (h) Total GST on Supply of goods and Services shall be indicated in Schedule -5
- (i) The Input Tax Credit (ITC) available, if any, under the GST law as per the relevant Government policies wherever applicable shall be taken into account by the Bidder while quoting bid price.

- (j) The Bidder shall include In-transit insurance charges in its bid prices as per insurance requirement mentioned in Section – IV: General Conditions of Contract (GCC) and Appendix-3: Insurance Requirements to Form of Contract Agreement as contained in Section VI: Sample Forms and Procedures (FORMS) of the Bidding Documents. Bidder shall further note that the Employer shall not be liable to make any payment/ reimbursement to the Contractor whatsoever for insurance of Contractor's Plant and Machinery.
- (k) The bidder shall fill up only the marked cell (shaded in green colour) in the work sheets of Schedule 1 to 7 and Discount, Taxes & duties. Bidder shall not carry out any modification or changes in any other cell. Required calculations will be carried out automatically in the respective work sheets of Schedule-6(Grand Summary), Schedule-6 (After Discount) (Grand Summary after discount) and Bid Form.
- (l) Bidders may like to ascertain availability of exemptions, reductions, allowances or benefits in case of goods and services to be supplied to the Employer. They shall solely be responsible for obtaining such benefits, and in case of failure to receive such benefits for any reasons whatsoever, the Employer will not compensate the Bidder. The Bidder shall furnish along with their bid, a declaration to this effect in Attachment 17 as per the format enclosed in the Bidding Documents.

Further, if issuance of the necessary certificate for availing such exemptions, reductions, allowances or benefits is permitted and is required to be issued by the Employer in line with the relevant policies, rules and procedures of Govt. of India in vogue, the same shall be considered for issuance by the Employer, provided the Bidder explicitly indicates in their bid that they have quoted prices after considering the applicable concessional duty/exemption. However, the Bidder alone shall be responsible for obtaining any benefits there from as may be admissible under Govt. policies/procedures and in case of their failure to receive such benefits, partly or fully, for any reason whatsoever, the Employer will neither be responsible nor be liable to compensate the Contractor, and the Employer shall have no financial liability on this account.

Where the Bidder has quoted taking into account such benefits, he must give all information required for issuance of such certificate in terms of the relevant notifications of the Govt. of India along with his bid in Attachment 17. In case bidder has not

indicated such information or has indicated “to be furnished later on” in Attachment 17, the same shall be construed to mean that no benefit has been passed on by the bidder to the Employer, and the Employer shall not issue any certificate to the contractor for availing the same even if admissible.

- (m) Employer shall, deduct taxes at source as per the applicable laws/rules, if any, and issue Tax Deduction at Source (TDS) Certificate to the Contractor.

- 11.4.1 To enable the bidders for effecting reductions in the prices already filled up in Price Schedules by way of discounts, the work sheet titled ‘Letter of Discount’ is included as part of price Schedules. Bidder can effect the reductions by filling up the discount either on lump sum basis or percent basis, which can be made applicable either on the total price or one or more of the price schedules.

The Bidder may note that in case he chooses to offer multiple discounts as per Sl. No. 1 to 4 in the work sheet “Letter of Discount”, all discounts shall be applicable simultaneously on the base prices of respective items on which the bidder has offered the discount(s) i.e., all the discounts shall be considered together on the Quoted Prices of such items (as quoted by the bidder without discount). Accordingly, the reduced prices shall be displayed in the work sheet "Sch-6 (After Discount)"

- 11.5 The prices shall be in accordance with the following:

Adjustable Price: Prices quoted by the Bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost elements such as labor, material, etc. in accordance with the procedures specified in the corresponding Appendix – 2 to the Form of Contract Agreement. A bid submitted with a fixed price quotation will not be rejected, but the price adjustment will be treated as zero. The price adjustment provision will not be taken into consideration in bid evaluation. Bidders are required to indicate the source of labour & materials indices in Attachment 12.

12. Bid Currencies

- 12.1 Prices shall be quoted in Indian Rupees Only.

13. Bid Security

- 13.1 The Bidder shall furnish, except as exempted herein below, as part of its bid, a bid security in the amount and currency as stipulated in the **BDS**. The bid security must be submitted in the form provided in the Bidding Documents.

Micro and Small Enterprises (MSEs) registered with Udyam Registration Portal as specified by Ministry of Micro, Small and Medium Enterprises are exempted from submission of Bid Security as per the Provisions of the Public Procurement Policy for Micro and Small Enterprises (MSEs) order 2012, Notification dated 01/06/2020 and 26/06/2020 read in conjunction with related notifications issued from time to time for such enterprises. This shall be subject to submission of 'Udyam Registration certificate' with regard to registration with authorities mentioned above in accordance with the relevant notifications/orders.

- 13.2 The bid security shall, at the bidder's option, be in the form of a crossed bank draft/pay order /banker certified cheque in favour of Employer as stipulated in **BDS** or a bank guarantee from a reputed bank selected by the bidder. The format of the bank guarantee shall be in accordance with the form of bid security included in the Bidding Documents. Bid Security shall be valid upto date as mentioned in BDS, or any other date as subsequently requested under ITB Sub-Clause 14.2.

Alternatively, if bid security is to be submitted in favor of POWERGRID, the same can be submitted as online payment through POWERGRID ONLINE PAYMENT UTILITY-<https://epay.powergrid.in>, a link of which is provided on the POWERGRID website www.powergrid.in. While making online payment towards Bid Security, the bidder shall choose Segment as "Suppliers" and fill in details as follows:

Payment Category	EMD
Sub-category	EMD payment-CC#
Name of Depositor	Name of the Bidder (<i>name of the Sole bidder or name of Lead partner of the Joint Venture (on behalf of the Joint Venture) in case of Joint Venture bids</i>
Vendor Code, if applicable	POWERGRID vendor code of the bidder, if existing (<i>vendor code of the Sole bidder or the lead partner of the Joint Venture</i>)
Payment Remarks	Bid Security for [<i>enter the name of the package</i>]

The copy of 'Online Payment Acknowledgement – Suppliers' generated subsequent to the payment shall be submitted along with hard copy part of the bid. The online payment facility shall be for payment in Indian Rupees only.

- 13.3 Any bid not accompanied by an acceptable bid security or Online Payment Acknowledgement towards Bid Security (along with the bid or subsequently pursuant to ITB Clause 21.1), except as exempted at 13.1 above, shall be rejected by the Employer as being nonresponsive, pursuant to ITB Sub-Clause 22.4. The bid security of a joint venture must be in the name of all the partners in the joint venture submitting the bid.
- 13.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, but not later than twenty-eight (28) days after the expiration of the bid validity period.
- 13.5 The successful Bidder shall be required to keep its bid security valid for a sufficient period till the performance security(ies) pursuant to ITB Clause 35 are furnished to the satisfaction of the Employer. The bid security of the successful Bidder will be returned when the Bidder has signed the Contract Agreement, pursuant to ITB Clause 34, and has furnished the required performance security, pursuant to ITB Clause 35.
- 13.6 The bid security may be forfeited
- (a) if the Bidder withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form; or
 - (b) In case the Bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid and/or accept the withdrawals/rectifications pursuant to the declaration/confirmation made by him in Attachment – Declaration of the Bid; or
 - (c) If a Bidder does not accept the corrections to arithmetical errors identified during preliminary evaluation of his bid pursuant to ITB Sub-Clause 27.2; or
 - (d) If, as per the requirement of Qualification Requirements the Bidder is required to submit a Deed of Joint Undertaking and he fails to submit the same, duly attested by Notary Public of the place(s) of the respective executant(s) or registered with the

Indian Embassy/High Commission in that Country, within ten days from the date of intimation of post – bid discussion; or

- (e) in the case of a successful Bidder, if the Bidder fails within the specified time limit
 - (i) to sign the Contract Agreement, in accordance with ITB Clause 34, or
 - (ii) to furnish the required performance security(ies), in accordance with ITB Clause 35 and/or to keep the bid security valid as per the requirement of ITB Sub-Clause 13.5.

13.7 No interest shall be payable by the Employer on the above Bid Security.

14. Period of Validity of Bid

14.1 Bids shall remain valid for the period of six months after the date of opening of Techno - Commercial Part i.e. First Envelope, prescribed by the Employer, pursuant to ITB Sub-Clause 20.1. A bid valid for a shorter period shall be rejected by the Employer as being non-responsive.

14.2 In exceptional circumstance, the Employer may solicit the Bidder's consent to an extension of the bid validity period. The request and responses thereto shall be made in writing or by cable. If a Bidder accepts to prolong the period of validity, the bid security shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required or permitted to modify its bid.

15. Format and Signing of Bid

15.1 The bidder shall prepare the bid in the manner indicated in ITB Clause 9.0 and submit the bid in following manner:

First Envelope:

- (i) The Electronic Form/Template of the bid for First Envelope (Techno-Commercial), as available on the portal, shall be duly filled.

These Electronic Forms/Templates shall be viewable by all the participating bidders after opening of First Envelope bids.

The soft copy of the bid consisting of the documents listed in ITB Clause 9 including relevant scanned documents (refer ITB Clause 15.4) shall be uploaded through the portal only. Submission of Soft Copy of any documents by any other means shall not be accepted by the Employer in any circumstances.

At the time of submission of the bid, Bidders are required to make sure that the First Envelope excel with file named **"First Envelope and Bid Forms"** must be uploaded alongwith the bid. (Please refer user manuals at the portal <https://etender.powergrid.in> regarding submission of bid).

(ii) Hard copy of followings:

- a) DD or Online Payment Acknowledgement towards Bidding Document fee of the amount as specified in accordance with clause 5.4 of ITB or documentary evidence in support of exemption of Bidding Document fee as per ITB 5.5;
- b) Bid Security (in Original) or Online Payment Acknowledgement towards Bid Security or documentary evidence in support of exemption of Bid Security, in separate envelope in accordance with clause 13 of ITB, Section-II;
- c) Integrity Pact (in Original) in accordance with clause 9.3 (o) of ITB, Section-II in separate envelope;
- d) Power of Attorney as per Clause 9.3 (b);
- e) In case of Bid from Joint Venture, the Joint Venture Agreement & Power of Attorney of Joint Venture Agreement;
- f) Safety Pact (in Original) in accordance with clause 9.3 (s) of ITB, Section-II in separate envelope.
- g) Any other document further specified in the BDS duly signed and stamped on each page

Second Envelope:

- (i) The Electronic Form/Template of the bid for Second Envelope (Price - Part) covering details regarding summary of price details.

These electronic forms/templates shall be viewable by all the participating bidders after opening of Second Envelope bids. Bidders to note that notwithstanding the prices quoted by the bidder in this electronic form, the Employer reserve the right to correct the prices for purpose of evaluation and award in accordance with the provisions of bidding documents.

The soft copy of the price schedules as per ITB Clause 11 to be uploaded on the portal. Submission of Soft Copy of any documents by any other means shall not be accepted by the Employer in any circumstances.

At the time of submission of the bid, Bidders are required to make sure that the Second Envelope excel with file named “Price_schedule” must be uploaded alongwith the bid. (Please refer user manuals at the portal <https://etender.powergrid.in> regarding submission of bid).

- 15.2 The bid shall contain no alterations, omissions or additions, unless such corrections are initialed by the person or persons signing the bid.
- 15.3 The Bidder shall furnish information as described in the last paragraph of the Bid Form on commissions or gratuities, if any, paid or to be paid to agents relating to this bid, and to contract execution if the Bidder is awarded the contract.
- 15.4 The List of following documents shall be scanned & uploaded on the portal as per table given below:

S. No.	Description of Documents	Name of File to be uploaded on the portal
1.	Power of Attorney	poa.pdf
2.	DD against Bidding Document fee	dd.pdf
3.	Constitution of legal status	legal.pdf
4.	Declaration for anticipated change in legal structure/ ownership	decl_legal.pdf
5.	The principal place of business	principal.pdf
6.	The place of Incorporation or the place of registration and the nationality of the owner	incorporation.pdf
7.	Technical Experience certificate issued by utility	techexp.pdf
8.	Financial Balance Sheets (for last five years)	balsheet.pdf
9.	Declaration in regard to Financial re-structuring	Decl_Fin_re_struc.pdf
10.	Technical GTP	gtp.pdf
11.	Type Test Report	ttreport.pdf
12.	Bank Certificate	bank.pdf
13.	Manufacturer Authorization	manuauth.pdf
14.	Work Schedule (BAR Chart)	barchart.pdf

S. No.	Description of Documents	Name of File to be uploaded on the portal
15.	Guarantee Declaration	guarantee.pdf
16.	Documentary Evidence for Base Price Indices	pvindex.pdf
17.	Cancelled Cheque	cheque.pdf
18.	MSE_registration certificate	MSE_registration certificate.pdf
19.	MSE owned by SC/ST entrepreneurs	MSE_SC-ST certificate.pdf
20.	MSE owned by women	MSE_Women certificate.pdf
21.	Online Payment Acknowledgement towards Bidding Document fee	Tender_fee_receipt.pdf
22.	Online Payment Acknowledgement towards Bid Security	Bid_Security_receipt.pdf
23.	Other Documents	other.pdf

1. Bidder may put three (03) characters suffix for each file preceded by an 'under-score' for their identification. (Example- poa_xyz.pdf)
2. In case more file are to be uploaded under the same head Numeric suffix may be put by the bidder. (Example - poa1_xyz.pdf, poa2_xyz.pdf, poa3_xyz.pdf.....)
3. For uploading any additional documents bidder may decide the name of file with prefix as 'other' succeeded by 'under score' and suffix as name of document in short. (Example - other_ISO certificate1_xyz.pdf, other_ISO certificate2_xyz.pdf)
4. For other types of files supported on the portal, please refer the related provisions on the portal.

D. Submission of Hard Copy of Bids

16. Sealing and Marking of Bids

- 16.1 The Bidder shall upload the soft copy part of the bid as per the provisions of the portal (refer para 15.1& 15.4 above) and submit the hard copy of DD or Online Payment Acknowledgement towards Bidding Document fee or documentary evidence in support of exemption of Document fee (as applicable), Bid Security or Online

Payment Acknowledgement or documentary evidence in support of exemption of Bid Security (as applicable), Integrity Pact, Safety Pact, Power of Attorney, Joint Venture Agreement (as applicable) and Power of Attorney of Joint Venture Agreement (as applicable) and Joint Deed of Undertaking (as applicable) (refer para 15.1 above), duly marked First Envelope (Techno – Commercial Part) in the following manner.

Envelope – 1: Bidding Document fee / Online Payment Acknowledgement towards Bidding Document fee/ documentary evidence in support of exemption of Bidding Document fee

Envelope – 2: Bid Security/ Online Payment Acknowledgement towards Bid Security/ documentary evidence in support of exemption of Bid Security

Envelope – 3 Integrity Pact

Envelope – 4: Power of Attorney, Joint Venture Agreement (as applicable) and Power of Attorney of Joint Venture Agreement (as applicable) and Joint Deed of Undertaking (as applicable) and any other documents as required (refer para 15.1 above).

Envelope –5: Safety Pact

The Bidder shall upload the Excel files of Price Schedule and Attachments downloaded from the portal as part of the bid duly filled in the required cells. If the bid submitted by the bidder is found different from the files downloaded from the portal, as part of the bidding document or tampered/modified locked contents, the bidder may run with risk of rejection of bid.

16.2 The envelope shall

- (a) be addressed to the Employer at the address given in the **BDS**, and
- (b) bear the contract name indicated in the **BDS**, the Invitation for Bids title and number indicated in the BDS, and the statement “Do Not Open Before [date],” to be completed with the time and date specified in the **BDS**, pursuant to ITB Sub-Clause 20.1.

16.3 DD or Online Payment Acknowledgement towards Bidding Document or documentary evidence in support of exemption of Document fee, Bid Securities or Online Payment Acknowledgement

towards Bid Security or documentary evidence in support of exemption of Bid Security, Integrity Pact and the Safety Pact in original shall be submitted in separate superscribed envelopes (one for DD towards Bidding Document, one for Bid Security, one for Integrity Pact and one for Safety Pact) alongwith First Envelope.

Bidder may upload Soft copy of the any other documents which they consider relevant along with First Envelope.

All the envelopes shall also indicate the name and address of the Bidder so that the bid can be returned unopened in case it is declared "late."

In case, pursuant to Ministry of Finance, GOI's Circular dated 17th July, 2012, the Bank Guarantee is issued using SFMS Platform by the banks located in India, the copy of such Bank Guarantee shall be submitted by the bidder along with the First Envelope. The Account details of POWERGRID for the purpose of Bank Guarantee (towards Bid Security) to be issued using SFMS Platform are as given below:

Name of the Bank and Address	IFSC Code	POWERGRID Current A/c No.
State Bank of India, 4 th & 5 th Floor, Parsvnath Capital Tower, Bhai Veer Singh Marg, Gole Market, New Delhi - 110001	SBIN0017313	10813608670
ICICI Bank, Unit No. 01, Solitaire Plaza, DLF Phase III, M.G. Road, Gurugram	ICIC0002451	000705002702

Note: Any one of the above account details can be used for the issuance of Bank Guarantee using SFMS Platform.

In case of Bank Guarantee (towards Bid Security) verification through SFMS facility of ICICI Bank, the applicant has to also provide a unique identifier of POWERGRID to the issuing bank. This unique identifier needs to be incorporated by the issuing bank in Field 7037 of the IFIN 760 COV/ IFIN 767 COV while transmitting these messages to the Beneficiary Bank through SFMS. The unique identifier of POWERGRID is PGCIL50948846.

In addition to the above, the Bank Guarantee (towards Bid Security) should be submitted in the Physical form as specified in ITB Clause 13.

- 16.4 If the envelope is not sealed and marked as required by ITB Sub-Clause 16.2 above, the Employer will assume no responsibility for the bid's misplacement or premature opening.

17. Deadline for Submission of Bids

- 17.1 Soft copy part of the bid shall be uploaded through the portal <https://etender.powergrid.in> at or before the submission time and date as stipulated in the bidding document. Hard copy of Bid Security in accordance with clause 13 of ITB, Section-II in separate envelope, Integrity Pact, Safety Pact, Power of Attorney, Joint Venture Agreement & Power of Attorney of Joint Venture Agreement (in case bid from Joint Venture) must be received by the Employer at the address specified under ITB Sub-Clause 16.2 no later than the time and date stated in the **BDS**. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the bids will be received/uploaded upto the appointed time on the next working day.

- 17.2 The Employer may, at its discretion, extend this deadline for submission of bids any time prior to opening of bids, in which case all rights and obligations of Employer and bidders will thereafter be subject to the deadline as extended.

Further the Employer also reserves the right to extend bid submission timeline or recall the tender if e- Procurement server is down (i.e. inaccessible / inoperative) for a prolonged period of time within the last 24 hours of the bid submission due date.

- 17.2.1 Notwithstanding above, the Employer may, at its discretion, extend the deadline for submission of soft part of the bids from 1100 hrs (IST) to 1500 hrs (IST) on the same day in case the bidder(s) faces difficulty in submission of bids on the e-Procurement portal even for reasons not attributable to the e-Procurement server. In such a case, the bidder(s) shall however, be required to send a written communication on the e-mail IDs mentioned below for the purpose before the deadline for submission of soft part of the bids i.e. 1100 hrs (IST) on the last day of the aforesaid deadline. Any request received by the Employer thereafter i.e. beyond 1100 hrs (IST) or received prior to the day of deadline for submission of soft part of the bids shall not be entertained under any circumstances. The time of receipt of such communication on the e-mail IDs mentioned below shall govern for the purpose of determining whether or not the communication has been received prior to the deadline for bid submission as stipulated. The bidder(s) may also note that the above recourse shall, however, be adopted only

once in the first such instance and no further extension on this account beyond 1500 hrs (IST) as above shall be given by the Employer.

The e-mail IDs for aforesaid purpose are mentioned in BDS:

18. Late Bids

- 18.1 The bidder shall not be permitted to submit the soft copy part of the bid by any mode other than uploading on the portal within the specified deadline for submission of bids. The e-Procurement system would not allow any late submission of bids through the portal after due date & time as specified in BDS.

In case Hard copy part of the bid is received by the Employer after the deadline for submission of the same prescribed by the Employer in the BDS, but the bidder has uploaded the soft copy part of the bid, the bid will be considered as late bid. In such a case, the soft copy part of the first envelope bid uploaded on the portal shall be opened in line with the provisions of Bidding Documents. Such bids will be rejected during preliminary examination. However, in case of MSEs who are exempted from submission if Bid security in line with ITB 13.1, submission of hard copy part after the deadline for submission of the same prescribed by the Employer in the BDS, shall not lead to outright rejection of the bid, but the documents required to be submitted in the hard copy part shall be sought through clarifications as brought out at ITB 21.1.

19. Modification and Withdrawal of Bids

- 19.1 Bidder may modify its bids through the relevant provisions on the portal <https://etender.powergrid.in>. The Bidder may modify or withdraw its bid after submission, provided that modification is done on the portal as well as notice is received by the Employer prior to the deadline prescribed for bid submission.
- 19.2 The Bidder's modifications shall be done and submitted as follows:
- (i) Modified Electronic form of the bid as per the provision of portal therein.
 - (ii) Soft copy of the entire bid if any modification is there.
- 19.3 Bidder may withdraw its bid through the relevant provisions of portal only.
- 19.4 No bid may be withdrawn in the interval between the bid submission deadline and the expiration of the bid validity period specified in ITB

Clause 14. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of its bid security, pursuant to ITB Sub-Clause 13.6.

E. Bid Opening and Evaluation

20. Opening of First Envelope by Employer

20.1 The Employer will open the First Envelope i.e. Techno – Commercial Part in public, including withdrawals and modifications made pursuant to ITB Clause 19, in the presence of bidders' designated representatives who choose to attend, at the time, date, and location stipulated in the **BDS**. The bidders' representatives who are present shall sign a register evidencing their attendance. Bidder who have submitted their bid may view on line tender opening on the portal from their end. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the bids will be received upto the appointed time on the next working day.

20.2 During the opening of bids, Envelopes marked "Withdrawal" shall be opened first. Bids withdrawn pursuant to ITB Clause 19 shall be not be opened.

20.3 For all other Bids, the bidders' names, deviation having cost of withdrawal, if any, the presence of bid security, Integrity Pact, Safety Pact and any such other details as the Employer may consider appropriate, will be get declared through the Portal by the Employer. Subsequently, all envelopes marked "Modification" shall be opened. No bid shall be rejected at bid opening except for late bids pursuant to ITB Clause 18. Soft copy of the bids shall be send to archive unopened. However, opening of bid, whether or not accompanied with the Tender fee and/or bid security and/ or Integrity Pact and/or Safety Pact, shall not be construed to imply its acceptability which shall be examined in detail pursuant to the provisions contained in this Section-II.

On behalf of Employer, the Integrity Pact and Safety Pact will be signed by its representative at the time of Bid Opening. One original of the Integrity Pact and Safety Pact will be retained by Employer and the other original will be returned to the representative of the bidders present during bid opening. If the Bidder's representative is not present during the Bid Opening, the other original shall be sent to the bidder by post/courier.

20.4 The Employer shall prepare minutes of the bid opening in the form of Bid Opening Statement, including the information disclosed to those present in accordance with ITB Sub-Clause 20.3.

20.5 Bids not opened at bid opening shall not be considered further for evaluation, irrespective of the circumstances and shall be send to archive unopened.

21. Clarification of Bids

21.1 During bid evaluation, the Employer may, at its discretion, ask the Bidder for a clarification of its bid. In case of erroneous/non submission of documents related to/identified in ITB Sub-Clause 9.3 (b), (o), (s), (t) and (u) or Deed of Joint Undertaking pursuant to ITB Sub-Clause 9.3 (c) & (e) or the complete annual reports together with Audited statement of accounts pursuant to ITB Sub-Clause 9.3 (c), Demand Draft towards the cost of Bidding Documents pursuant to ITB 5.4, documentary evidence with regard to registration with designated Authority of GoI under the Public Procurement Policy for MSEs pursuant ITB 5.5 or 13.1, documentary evidence with regard to MSE owned by SC/ST entrepreneurs in line with Public Procurement Policy for MSEs pursuant to ITB 9.3(p), required to be submitted by the Bidder as per the provisions of the Bidding Documents, the Employer may give the Bidder not more than 7 working days notice to rectify/furnish such documents, failing which the bid shall be rejected. The request for clarification and the response shall be in writing, and no change in the price or substance of the bid shall be sought, offered or permitted.

In case of non submission of documents related to/identified in Attachment-11 {‘Information regarding ex-employees of Employer in Bidder’s firm’}, the Employer may give the Bidder not more than 7 working days notice to rectify/furnish such documents, failing which Employer reserves the right to reject such bids. Employer shall be sole judge in this regard.

22. Preliminary Examination of First Envelope

22.1 The Employer will examine the bids to determine whether they are complete, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

In case of non-submission of bid in the portal (soft copy part of the bid) within the stipulated deadline, then even if the bidder has submitted the specific documents in hard copy part in original within

the stipulated deadline pursuant to ITB 17.1, its bid shall be considered as incomplete bid, which shall be summarily rejected.

Similarly, in case of non-submission of Hard copy part of the bid, but the bidder has uploaded the soft copy part of the bid, the bid will be considered as incomplete bid. In such a case, the soft copy part of the first envelope bid uploaded on the portal shall be opened. Such bids will be rejected during preliminary examination. However, in case of MSEs who are exempted from submission of Bid Security in line with ITB 13.1, non-submission of Hard copy part shall not lead to outright rejection of the bid, but the documents required to be submitted in the hard copy part shall be sought through clarifications as brought out at ITB 21.1.

- 22.2 The Employer may waive any minor informality, nonconformity or irregularity in a bid that does not constitute a material deviation, whether or not identified by the Bidder in Attachment 6 to its bid, and that does not prejudice or affect the relative ranking of any Bidder as a result of the technical and commercial evaluation, pursuant to ITB Clause 24.
- 22.3 Prior to the detailed evaluation, the Employer will determine whether each bid is complete and is substantially responsive to the Bidding Documents. Any deviations, conditionality or reservation introduced in Attachment-6 and/or in the Bid Form, Technical Data Sheets and covering letter, or in any other part of the bid will be reviewed to conduct a determination of the substantial responsiveness of the bidder's bid. For purposes of this determination, a substantially responsive bid is one that conforms to all the terms, conditions and specifications of the Bidding Documents without material deviations, objections, conditionalities or reservations. A material deviation, objection, conditionality or reservation is one (i) that affects in any substantial way the scope, quality or performance of the contract; (ii) that limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the successful Bidder's obligations under the contract; or (iii) whose rectification would unfairly affect the competitive position of other bidders who are presenting substantially responsive bids.
- 22.3.1 Bids containing deviations from critical provisions relating to GCC Clauses 2.14 (Governing Law), 8 (Terms of Payment), 9.3 (Performance Security), 10 (Taxes and duties), 21.2 (Completion Time Guarantee), 22 (Defect Liability), 23 (Functional Guarantee), 25 (Patent Indemnity), 26 (Limitation of Liability), 38 (Settlement of Disputes), 39

(Arbitration) and Appendix 2 to the Form of Contract Agreement (Price Adjustment) will be considered as non-responsive.

- 22.3.2 Regarding deviations, conditionality or reservations introduced in the bid, which will be reviewed to conduct a determination of substantial responsiveness of the Bidder's bid as stated in ITB Sub-Clause 22.3, the order of precedence of these documents to address contradictions, if any, in the contents of the bid, shall be as follows:

- I. Bid Form
- II. Attachment-6 : Deviations
- III. Technical Data Sheet
- IV. Any other part of the bid

Contents of the document at Sr. No. I above will have overriding precedence over other documents (Sr. No. II to IV above). Similarly, contents of document at Sr. No. II above will have overriding precedence over other documents (Sr. No. III to IV above), and so on.

- 22.4 If a bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by the Bidder by correction of the nonconformity. The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

23. Qualification

- 23.1 The Employer will ascertain to its satisfaction whether Bidders determined having submitted substantially responsive bids are qualified, as per the Qualification Requirement specified in Annexure - A (BDS) to satisfactorily perform the contract. The Employer shall be the sole judge in this regard and the Employer's interpretation of the Qualification Requirement shall be final and binding.

Notwithstanding the above, criteria as per ITB Clause 23.2 shall also be required to be met.

The Employer also reserves the right to verify the Qualification data requirement by physical visit, and/or through Indian Embassy in case of data of foreign origin, or any other means as it may consider appropriate.

- 23.2 The determination will take into account the Bidder's financial, technical capabilities including production capabilities, in particular the Bidder's contract work in hand, future commitments & current

litigation and past performance including fatal accidents during execution of contracts that have been awarded by the Employer on the Bidder. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder in Attachment 3 to the bid, as well as such other information as the Employer deems necessary and appropriate. This shall, however, be subject to assessment that may be carried out, if required, by the Employer as per the provisions of Annexure -A (BDS).

The determination will also take into account the history of accidents in which the Bidder is involved in the contracts with the Employer as under:

Subsequent to Bidder's involvement in two cumulative fatal accidents during any financial year, bids, which are otherwise substantially responsive and are ascertained to be qualified to satisfactorily perform the Contract, submitted by such bidder for three(03) packages, whose actual date of bid opening falls after the date of the second fatal accident shall be considered non-responsive.

Subsequent to Bidder's involvement in three cumulative fatal accidents during any financial year, bids, which are otherwise substantially responsive and are ascertained to be qualified to satisfactorily perform the Contract, submitted by such bidder for five(05) packages whose actual date of bid opening falls after the date of the third fatal accident shall be considered non-responsive.

If there is re-occurrence of fatal accidents after the third fatal accident during the financial year, bids submitted by such bidder for all packages whose date of bid opening, originally scheduled and/or actual, falls within the one year reckoned from the date of the last fatal accident, shall be considered non-responsive.

For the aforesaid purpose, the count for number of fatal accidents shall be financial year wise (year ending March). The Employer shall be the sole judge in this regard.

Further, the count of bids for five (05) packages to be considered non-responsive on account of occurrence of third fatal accident shall be subsequent to the count of bids for three (03) packages to be considered non-responsive on account of occurrence of second fatal accident. However, once the bids are considered non-responsive for one year reckoned from the date of re-occurrence of fatal accidents after the third fatal accident, the provisions for non-responsiveness due to second/third fatal accident shall be superseded by the aforesaid.

Non-reporting of any accident to the Employer in any ongoing contract with the Employer or any suppression of facts/related information in regard to accident shall lead to determination of bid of such bidders as non-responsive for all packages whose date of bid opening, originally scheduled and/or actual falls within a period of one year reckoned from the date on which the Employer determines Non-reporting of the accident/Suppression of facts/related information in regard to accident by the Bidder.

In case of a fatal accident in a contract awarded to Joint Venture of 2 or more firms, for the purpose of determining responsiveness of bids, the accident shall be considered to have been committed by partner(s) of the JV who was responsible for the execution of the said works as per their scope under the Contract.

In case of a fatal accident in a contract awarded to and being executed by an Associate of Contractor, for the purpose of determining responsiveness of bids, the accident shall be considered to have been committed by the Associate who is executing the erection/services contract corresponding to the scope of work in which accident has occurred.

In case of the bidder's failure to submit its Board Resolution, after review of fatal accidents in any on-going Contracts with the Employer, along with the action plan for avoidance of such incidences to the Employer and/or in case the CEO of the Bidder does not apprise the POWERGRID APEX SAFETY BOARD of the cause of Fatal accident and their future action plan/safety preparedness to prevent recurrence of such accidents in future within 60 days of fatal accidents plus the extended period of 4 weeks as brought out in GCC, their bids shall be treated as non-responsive till completion of the above actions.

- 23.3 The Employer may waive any minor informality, nonconformity or irregularity in a bid that does not constitute a material deviation, affecting the capability of the Bidder to perform the Contract.
- 23.4 An affirmative determination will be a prerequisite for the Employer to evaluate the Techno - Commercial Part and open the Second Envelope of the Bidder. A negative determination will result in rejection of the Bidder's bid.
- 23.5 In case of new bidders, assessment shall be done as per the provisions of Qualification Requirement for the Bidder, enclosed as Annexure-A (BDS) taking into consideration all relevant aspects. The bidder's

capacity and capability for award of Contract(s) shall be based on such assessment.

23.6 For all above purposes, Employer shall be sole judge in this regard.

24. Evaluation of Techno - Commercial Part (First Envelope)

24.1 The Employer will carry out a detailed evaluation of the bids of the qualified bidders in order to determine whether the technical aspects are in accordance with the requirements set forth in the Bidding Documents. In order to reach such a determination, the Employer will examine the information supplied by the bidders, pursuant to ITB Clause 9, and other requirements in the Bidding Documents, taking into account the following factors:

- (a) overall completeness and compliance with the Technical Specifications and Drawings; deviations from the Technical Specifications as identified in Attachment 6 to the bid and those deviations not so identified; suitability of the facilities offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the bid. The bid that does not meet minimum acceptable standards of completeness, consistency and detail will be rejected for non-responsiveness.
- (b) achievement of specified performance criteria by the facilities
- (c) compliance with the time schedule called for in the corresponding Appendix to the Form of Contract Agreement and evidenced as needed in a milestone schedule provided in the bid;

Time schedule (program of performance)

The plant and equipment covered by this bidding shall have the 'Taking Over' by the Employer after successful Completion within the period specified in **BDS**. Bidders are required to base their prices on the time schedule given in Appendix 4 to the Form of Contract Agreement (Time Schedule) or, where no time schedule is given in Appendix 4, on the Completion date(s) given above. No credit will be given to earlier completion. Bids offering completion beyond the specified period are liable to be rejected.

- (d) type, quantity and long-term availability of mandatory and recommended spare parts and maintenance services

- (e) any other relevant technical factors that the Employer deems necessary or prudent to take into consideration.
- (f) any deviations to the commercial and contractual provisions stipulated in the Bidding Documents.
- (g) details furnished by the bidder in response to the requirements specified in Volume-II of the Bidding Documents.
- (h) The acceptability of the vendors and subcontractors proposed in Attachment 5 to be used by the Bidder will be evaluated. Should a vendor or subcontractor, for the items other than those covered under Annexure-A (BDS), be determined to be unacceptable, the bid will not be rejected, but the Bidder will be required to substitute an acceptable vendor or subcontractor without any change to the bid price.

24.2 Where alternative technical solutions have been permitted and offered in Attachment 7 to the bid, the Employer will make a similar evaluation of the alternatives, which will be treated in the technical and commercial evaluations as if they were base bids. Where alternatives are not permitted, but have in any event been offered, they shall be ignored.

25. Opening of Second Envelope by Employer

25.1 The Second Envelope i.e., Price Part of only those Bidders shall be opened who are determined as having submitted substantially responsive bids and are ascertained to be qualified to satisfactorily perform the Contract, pursuant to ITB Clause 23 and 24. Such Bidders shall be intimated through portal only about the date and time for opening of Price Part i.e., Second Envelope of the Bids by the Employer. A negative determination of the bids pursuant to ITB Clause 23 and 24, shall be notified by the Employer to such Bidders and the Second Envelope submitted by them shall be sent to archive unopened and the bid security shall be returned.

25.2 The Employer will open Second Envelope i.e., Price Part at the specified time and date in the presence of bidders' designated representatives who choose to attend, at the time, date, and location stipulated in the intimation for opening of Second Envelope. The bidders' representatives who are present shall sign a register evidencing their attendance. Bidders who have submitted their bid and found qualified as mentioned at para 25.1 above may view online tender opening on the portal from their end.

25.3 The bidders' names, the Bid Prices, including any alternative Bid Price or any discounts, and any such other details as per Electronic form filled in by the bidder on the portal will become viewable at the time of opening of bids. The prices and details as filled up in Electronic Form/Template by the bidder and opened during the bid opening and recorded in the Bid Opening Statement would not be construed to determine the relative ranking amongst the Bidders, or the successful Bidder, and would not confer any right or claim whatsoever on any Bidder. The successful Bidder (also referred to as the L1 Bidder) shall be determined as per the provisions of this Section – II and considered for award of contract as provided in ITB Clause 31.

25.4 The Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with ITB Sub-Clause 25.3.

25.5 Bids not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances.

26. Conversion to Single Currency

26.1 This shall not be applicable as domestic firms are required to quote the prices in Indian Rupees only.

27. Evaluation of Second Envelope (Price Part)

27.1 The Employer will examine the Price Parts (Second Envelopes) to determine whether they are complete, whether any computational errors have been made, whether the documents have been properly signed, and whether the bids are generally in order.

The Price Part containing any deviations and omissions from the contractual and commercial conditions and the Technical Specifications which have not been identified in the First Envelope are liable to be rejected.

27.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity specified by the Employer, or between subtotals and the total price, the unit or subtotal price shall prevail, and the quantity and the total price shall be corrected. However, in case of items quoted without indicating any quantity or the items for which the quantities are to be estimated by the Bidder, the total price quoted against such items shall prevail. If

there is a discrepancy between words and figures, the amount in words will prevail.

If there is a discrepancy between the quantity specified by the Employer and the quantity indicated by the bidder in any price schedules, the quantity specified by the Employer shall prevail and shall be corrected accordingly.

The prices of all such item(s) against which the Bidder has not quoted rates/amount (viz., items left blank or against which '-' is indicated) in the Price Schedules will be deemed to have been included in other item(s).

If the discount(s)/rebate(s) offered by the Bidder is a percentage discount and the price component(s) on which the said discount is not indicated in the bid, the same shall be considered on the total bid price [i.e. proportionately on each price component], in the event of award. However, if lump-sum discount is offered, the same shall be considered in full on the Ex-works price component (by proportionately reducing Ex-works price of individual items), in case of award. Further, Conditional discounts/rebates, if any, offered by the bidder shall not be taken into consideration for evaluation. It shall, however, be considered in case of award.

In respect of taxes, duties and other levies indicated by the Bidder in the Bid, which are reimbursable in line with the provisions of the Bidding Documents, the applicable rate and amount thereof shall be ascertained by the Employer based on which, if required, necessary rectification and arithmetical correction shall be carried out by the Employer. If the bidder has left the cells for confirmation of HSN/SAC code and/or corresponding rate of GST "blank", the HSN/SAC code and/or corresponding rate indicated by the Employer shall be deemed to be the one confirmed by the Bidder. The GST rate and amount so ascertained by the Employer for the said HSN/SAC code shall prevail.

The rate of GST for the purpose of evaluation shall be the rate of GST as confirmed/deemed confirmed by the bidder for each item in the bid/schedules.

If there is difference in HSN/SAC classification and corresponding rate of GST of an item as confirmed/deemed confirmed by the bidder in its bid and HSN/SAC and corresponding rate of GST as interpreted under any interpretation/ judgment/ Notification/ Circular issued under the GST law before or after the award of contract, GST

reimbursable to the bidder/Contractor shall be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.

The subtotal, total price or the total bid price to be identified in Bid Form for this purpose, irrespective of the discrepancy between the amount for the same indicated in words or figures shall be rectified in line with the procedure explained above.

If the Bidder does not accept the correction of errors as per this clause, its bid will be rejected and the amount of Bid Security forfeited.

- 27.3 The comparison shall be on the total price in Price Schedule No. 6 (After Discount) and considering applicable discount offered by the bidder in different manner at s. no. 6 of "Letter of Discount", if applicable.

The comparison shall also include the applicable taxes, duties and other levies, which are reimbursable in line with the provisions of the Bidding Documents.

The Employer's comparison will also include the costs resulting from application of the evaluation procedures described in ITB Sub-Clause 27.4 & 27.5.

- 27.4 The Employer's evaluation of a bid will take into account, in addition to the bid prices indicated in Price Schedule Nos. 1 through 5 (Second Envelope), the following costs and factors that will be added to each Bidder's bid price in the evaluation using pricing information available to the Employer, in the manner and to the extent indicated in ITB Sub-Clause 27.5 and in the Technical Specifications:

- (a) the cost of all quantifiable deviations and omissions from the contractual and commercial conditions and the Technical Specifications as identified in the evaluation of First Envelope, and other deviations and omissions not so identified;
- (b) the functional guarantees of the facilities offered;

Bidders shall state the functional guarantees (e.g., performance, efficiency, consumption) of the proposed facilities, named in the **BDS**, in response to the Technical Specifications. Plant and equipment offered shall have a minimum (or a maximum, as the case may be) level of functional guarantees specified in the Technical Specifications to be considered responsive. Bids

offering plant and equipment with functional guarantees less (or more) than the minimum (or maximum) specified shall be rejected.

- (c) the performance of the equipment offered;

Bidder shall state the guaranteed performance or efficiency of the Equipments, named in the **BDS**, in response to the Technical Specifications. Equipment offered shall have a minimum (or a maximum, as the case may be) level of guarantees specified in the Technical Specifications to be considered responsive. Bids offering plant and equipment with guarantees less (or more) than the minimum (or maximum) specified shall be rejected.

- (d) the extra cost of work, services, facilities, etc., required to be provided by the Employer or third parties;
- (e) any other relevant factors listed in **BDS**.

The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the contract, shall not be taken into account in bid evaluation.

27.5 Pursuant to ITB Sub-Clause 27.4, the following evaluation methods will be followed:

- (a) Contractual and commercial deviations

The evaluation shall be based on the evaluated cost of fulfilling the contract in compliance with all commercial, contractual and technical obligations under this Bidding Documents. In arriving at the evaluated cost, towards deviations whether material or minor identified in the evaluation of First Envelope, the cost of withdrawal indicated by the bidder in Attachment-6 of the First Envelope will be used. If such a price is not given except for material deviation, the Employer will make its own assessment of the cost of such a deviation for the purpose of ensuring fair comparison of bids.

In those cases, where the bidder has taken a material deviation but has not indicated the cost of withdrawal, the bid shall be treated as non- responsive and shall not be considered further.

- (b) Functional Guarantees of the facilities

For the purposes of evaluation, the adjustment specified in the Technical Specifications will be added to the bid price for each drop (or excess) in the responsive functional guarantees offered by the Bidder, below (or above) either a norm of one hundred (100) or the value committed in the responsive bid with the most performing functional guarantees, as specified in the Technical Specifications.

(c) Performance Guarantees of the Equipments

For the purposes of evaluation, the adjustment specified in the **BDS** will be added to the bid price.

(d) Work, services, facilities, etc., to be provided by the Employer

Where bids include the undertaking of work or the provision of services or facilities by the Employer in excess of the provisions allowed for in the Bidding Documents, the Employer shall assess the costs of such additional work, services and/or facilities during the duration of the contract. Such costs shall be added to the bid price for evaluation.

27.6 Any adjustments in price that result from the above procedures shall be added, for purposes of comparative evaluation only, to arrive at an "Evaluated Bid Price." Bid prices quoted by bidders and rectified as per ITB Sub Clause 27.2 shall remain unaltered.

28. Purchase/ Domestic Preference

28.1 Purchase Preference as admissible under the policy of Government of India in vogue will be allowed to Central Public Sector Enterprises in evaluation and comparison of bids.

29. e-Reverse Auction (e-RA)

29.1 The electronic Reverse Auction (e-RA) shall be conducted for further reduction in the price in the manner as indicated herein below.

29.2 Based on "Evaluated Bid Price" determined pursuant to ITB Sub Clause 27.6, the Bidders shall be ranked in an ascending order. Basis such ranking, the lowest ranked $N/2$ bidders (in case 'N' is even) or $(N+1)/2$ bidders (in case 'N' is odd), subject to minimum of three (03) bidders, shall be invited to participate in the e-Reverse Auction (e-RA), where 'N' is the number of bidders whose bids have been found

to be responsive and their “Evaluated Bid Price” has been determined in accordance with ITB Sub Clause 27.6.

- 29.3 However, in case only bids of two bidders are found to be responsive whose “Evaluated Bid Price” has been determined in accordance with ITB Sub Clause 27.6, the e-RA would be carried out with both the parties.
- 29.4 The Applicable Ceiling Price for e-RA for bidders shall be “Evaluated Bid Price” determined in accordance with ITB Sub Clause 27.6. During e-RA, these Bidders shall be permitted to place their prices lower than the Applicable Ceiling Price.
- 29.5 The e-RA shall be conducted on a designated electronic platform of any Application Service Provider (hereinafter referred to as “ASP”), for and on behalf of the Employer.
- 29.6 The ASP, as and when authorized by the Employer, will intimate the bidders, regarding details of electronic platform, procedure/ modality of e-RA process and other details, prior to e-RA.
- 29.7 Notwithstanding above, the bidder(s) who either do not submit the requisite compliances for e-RA do not participate in e-RA, their original price bid as opened, if valid, shall be considered for evaluation.
- 29.8 The Employer shall be the sole judge in this regard.

30. Confidentiality and Contacting the Employer

- 30.1 After the public opening of bids, information relating to the examination, clarification, and evaluation of bids and recommendations concerning awards shall not be disclosed to Bidders or other persons not officially concerned with this process until the publication of contract award. From the time of bid opening to the time of contract award, if any Bidder wishes to contact the Employer on any matter related to its bid, it should do so in writing.
- 30.2 Any effort by a Bidder to influence the Employer in the Employer’s bid evaluation, bid comparison or contract award decisions may result in rejection of the Bidder’s bid. The Employer shall be the sole judge in this regard.

F. Award of Contract

31. Award Criteria

31.1 Subject to ITB Clause 32, the Employer will award the contract to the successful Bidder (also referred to as the L1 Bidder) whose bid has been determined to be substantially responsive and to be the lowest evaluated bid, further provided that the Bidder is determined to be qualified, as per the Qualification Requirement specified in Annexure-A (BDS) to perform the contract satisfactorily.

31.2 The Employer may request the Bidder to withdraw any of the deviations listed in the winning bid.

At the time of Award of Contract, if so desired by the Employer, the bidder shall withdraw the deviations listed in Attachment 6 to the First Envelope at the cost of withdrawal stated by him in the bid. In case the bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid, his bid will be rejected and his bid security forfeited.

Bidder would be required to comply with all other requirements of the Bidding Documents except for those deviations which are accepted by the Employer.

31.3 The Employer reserves the right to vary the quantity of any of the spares and/or delete any items of spares altogether at the time of Award of Contract.

31.4 The mode of contracting with the successful bidder will be as per stipulation outlined in GCC Sub-Clause 2.1 and briefly indicated below:

31.4.1 The award shall be made as follows:

- (i) First Contract (*Supply of Goods*): For Ex-works supply of all equipments and materials including mandatory spares and Type Tests to be conducted (whether in India or abroad).
- (ii) Second Contract (*Supply of Services*): For providing all services i.e. inland transportation for delivery at site, In-transit insurance, unloading, handling at site, installation, Testing and Commissioning including performance testing in respect of all the equipments supplied under the "First Contract", Training to be imparted (whether in India or abroad) and any other services specified in the Contract Documents.

Both contracts will contain a cross fall breach clause specifying that breach of one will constitute breach of the other.

32. Employer's Right to Accept any Bid and to Reject any or all Bids

- 32.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Employer's action.

33. Notification of Award

- 33.1 Prior to the expiration of the period of bid validity, the Employer will notify the successful Bidder in writing, that its bid has been accepted. The notification of award will constitute the formation of the contract.

- 33.2 The Employer shall publish the results on its website, identifying the bid and Specification numbers and the following information: (i) name of each Bidder who submitted a Bid; (ii) bid prices displayed as per e-form at bid opening; (iii) name and evaluated prices of each Bid that was evaluated; (iv) name of bidders whose bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded.

The Employer shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with above, requests in writing the grounds on which its bid was not selected.

- 33.3 Upon the successful Bidder's furnishing of the performance security pursuant to ITB Clause 35, the Employer will promptly discharge the bid securities, pursuant to ITB Sub-Clause 13.4 & 13.5.

34. Signing the Contract Agreement

- 34.1 At the same time as the Employer notifies the successful Bidder that its bid has been accepted, the Employer in consultation with the Bidder will prepare the Contract Agreement provided in the Bidding Documents, incorporating all agreements between the parties.

- 34.2 The Contract Agreement shall be prepared within twenty-eight (28) days of the Notification of Award and the successful Bidder and the Employer shall sign and date the Contract Agreement immediately thereafter.

35. Performance Security

- 35.1 Within twenty-eight (28) days after receipt of the Notification of Award, the successful Bidder shall furnish the performance security for 10% (Ten percent) of the contract price plus additional performance securities, if any, in line with the requirement of Qualification Requirements, in the amount given in the **BDS** and in the form provided in Section VI, Sample Forms and Procedures, of the Bidding Documents. The performance security of a joint venture shall be in the name of joint venture.
- 35.2 Failure of the successful Bidder to comply with the requirements of ITB Clause 34 or Clause 35 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security, in which event the Employer may make the award to the next lowest evaluated Bidder or call for new bids.

36. Fraud and Corruption

It is the Employer's policy that requires the Bidders, suppliers and contractors and their subcontractors under the contracts to observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the Employer:

- (a) defines, for the purpose of this provision, the terms set forth below as follows:
- (i) "Corrupt Practice" means offering, giving, receiving, or soliciting anything of value to influence the action of Employer official(s) in the procurement process.
 - (ii) "Fraudulent Practice" means any act including suppression/ misrepresentation of facts, submissions of forged/ false documents, making false declarations etc. that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial gain or benefit, or to avoid an obligation, or to influence procurement process to the detriment of interest of the Employer, including collusive practices among bidders (prior to or after bid submission) to establish bid prices at artificial, non-competitive levels and to deprive Employer of the benefits of competitive prices.
 - (iii) "collusive practice" shall also include an arrangement between two or more parties designed to achieve an

illegitimate purpose to the detriment of interest of Employer.

(iv) “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(v) “Obstructive practice” means

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/ or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation,

or

(bb) acts intended to materially impede the exercise of the contractual rights or audit or access to information.

(b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

(c) will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract; and

(d) will have the right to require that the provision be included in Bidding Documents and in contracts, requiring Bidders, suppliers, and contractors and their sub-contractors to permit the Employer to inspect their accounts and records and other documents relating to bid submission and contract performance and to have them audited by auditors appointed by the Employer.

----- End of Section-II (ITB) -----

SECTION – III

BID DATA SHEETS (BDS)

BID DATA SHEETS (BDS)

The following bid specific data for the Plant and Equipment to be procured shall amend and/or supplement the provisions in the Instruction to Bidders (ITB):

Sl. No.	ITB Clause Ref. No.	Bid Data Details
1.	ITB 1.1	The Owner is: Power Grid Corporation of India Limited, `Saudamini', Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001. Kind Attn.: Sr. General Manager (CS) / Sr. DGM (CS-G7)/ Manager (CS-G7) (Thru Board) +91-124-282- 2397/3313/2353 Mobile: +91- 9910378008/ 9971399074/9599814162 Fax Nos.:- +91-124-2571 831 Email Address: edward@powergrid.in; nrapendra@powergrid.in rmendhe@powergrid.in
2.	ITB 1.1	The Employer is: Power Grid Corporation of India Limited, `Saudamini', Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001. Kind Attn.: Sr. General Manager (CS) / Sr. DGM (CS-G7)/ Manager (CS-G7) (Thru Board) +91-124-282- 2397/3313/2353 Mobile: +91- 9910378008/ 9971399074/9599814162 Fax Nos.:- +91-124-2571 831 Email Address: edward@powergrid.in; nrapendra@powergrid.in rmendhe@powergrid.in
3.	ITB 2	<u>Supplementing ITB clause 2:</u> For this package, Bid from Joint Venture is not permitted.
4.	ITB 2.1	Replace ITB 2.1 with the following: This Invitation for Bids, issued by the Employer is open to all firms including company(ies), Government owned Enterprises registered and incorporated in India as per Companies Act, 1956, barring Government Department as well as foreign bidders/MNCs not registered and incorporated in India and those bidders with whom business is banned by the Employer. Any Bidder from a country which shares a land border with India

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		will be eligible to bid only if the Bidder is registered with the Competent Authority as per order no. F.No.6/18/2019-PPD (Order Public Procurement no.1) dated 23/07/2020, F.No.6/18/2019-PPD (Order Public Procurement no.2) dated 23/07/2020, and F.No.7/10/2021-PPD(1) (Order Public Procurement no.4) dated 23/02/2023 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India (DoE Order). Further, any bidder (including bidder from India) having specified Transfer of Technology (ToT) arrangement with an entity from a country which shares land border with India, shall also require to be registered with the same competent authority. Registration should be valid at the time of submission of bids as per ITB 17 and at the time of Notification of Award as per ITB 33. However, the aforesaid condition for registration of Bidders from countries (even if sharing land border with India) shall not be applicable to Bidders from such countries to which Government of India has extended lines of credit or in which Government of India is engaged in development projects. For the aforesaid purpose, (i) “Bidder” means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical persons not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process (ii) “Bidder from a country which shares a land border with India” for this purpose means: - An entity incorporated, established or registered in such a country; or - A subsidiary of an entity incorporated, established or registered in such a country; or - An entity substantially controlled through entities incorporated, established or registered in such a country; or - An entity whose beneficial owner is situated in such a country; or - An Indian (or other) agent of such an entity; or - A natural person who is a citizen of such a country; or - A consortium or joint venture where any member of the consortium or joint venture falls under any of the above (iii) The beneficial owner for the purpose of (ii) (d) above will be under: - In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together , or through one or more juridical person, has controlling ownership interests or who exercises control through

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		other means Explanation- a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five percent of shares or capital or profits of the company b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreement or voting rights; 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership; 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals; 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership. An Agent is a person employed to do any act for another, or to represent another in dealings with third person. Further, the successful Bidder shall not allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority. This restriction on subcontracting shall not be applicable for procurement of raw materials, components, sub-assemblies etc. However, in case of finished goods procured directly/indirectly from the vendors from the countries sharing land border with India, such vendor will be required to be registered with the Competent Authority. The Bidder shall in its bid submit a certificate in compliance to DoE order as per the given format.

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		Further, the firm has to be a ‘Class-I local supplier’ as defined under Public Procurement (Preference to Make in India) Order, 2017 issued by Department for promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India vide order dated 15/06/2017, its revision dated 16/09/2020 (PPP-MII Order) read in conjunction with ‘Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Power Sector’ order dated 16/11/2021 issued by Ministry of Power (MoP Order) and ‘Public Procurement (Preference to Make in India) Order 2017- Notification of Telecom Products, Services or works’ issued by Department of Telecommunications (DoT), vide notification dated 29/08/2018 (DoT Order) and subsequent modifications/ amendments if any Presently, the local content requirement to categorize a supplier as ‘Class-I local supplier’ is Minimum 60%. Firms who are not ‘Class-I local supplier’ shall not be eligible to bid. The ‘Class-I local supplier’ shall give a self-certification in his bid in the given format, indicating the percentage of Local Content and certifying that the item offered meets the Local Content requirement for ‘Class –I local supplier’ and shall give details of the location(s) at which value addition is made. Further, in case of packages above Rs. 10 Cr, the ‘Class-I local supplier’ shall provide a certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content. Any false declaration regarding Local Content by the bidder shall be a transgression of Integrity Pact and action shall be taken in line with provisions of the Integrity Pact and in line with the provisions of the PPP-MII Order. Further, in case price reduction during e-RA, the ‘Class –I local supplier’ shall ensure that the item offered meets the Local Content requirement considering the revised prices. Further, entities of countries which have been identified by the Nodal Ministry/Department identified under PPP-MII order, as not allowing Indian companies to participate in their Government procurement for any item related to that Nodal Ministry shall not be allowed to participate in bidding for all items related to that Nodal Ministry/Department, except for the list of items published by the Ministry/Department permitting their participation. The term ‘entity’ of a county shall have the same meaning as under the FDI Policy of DPIIT as amended from time to time. Firms, who are executing contract(s) or has executed contract(s) in the past for the Employer (Owned as well as Consultancy) and any of the following event(s) have been encountered during contract(s) execution, shall not be eligible to bid for the package(s) whose originally

Sl. No.	ITB Clause Ref. No.	Bid Data Details																					
		scheduled date of bid opening falls within the specified period reckoned from the date of determination by the Employer of such event as below: <table border="1"> <tr> <th>Sr. No.</th><th>Event</th><th>Period for which bid(s) shall be considered as non-responsive/ not eligible</th></tr> <tr> <td>1.</td><td>Termination of Contract due to Contractor's default</td><td>1 year</td></tr> <tr> <td>2.</td><td>Encashment of CPG due to non-performance</td><td>1 year</td></tr> <tr> <td>3.</td><td>Repeated failure of major Equipment while in service</td><td>1 year</td></tr> <tr> <td>4.</td><td>Substantial portion of works (more than 50% of the Contract*) is sub-contracted, under an existing Contract</td><td>1 year</td></tr> <tr> <td>5.</td><td>More than 25% of the Contract price (awarded value), in aggregate, is paid to sub-contractors/suppliers as Direct payment, under an existing Contract, due to financial position of Contractor</td><td>1 year</td></tr> <tr> <td>6.</td><td>Firm has been referred to NCLT under Insolvency & Bankruptcy Code (<i>IRP has been appointed or Liquidation proceedings have been initiated under IBC</i>)</td><td>Till the firm comes out of Resolution process</td></tr> </table> <i>*For the purpose of working out 50% of the Contract, following shall be taken into account:</i> (a) <i>Scope of the contract which is permissible to be sub-contracted as per bidding documents, shall be excluded.</i> (b) <i>Scope of the Contract which primarily relates to the Qualification Requirement (QR) of the bidder.</i> The Employer shall be the sole judge in this regard and the Employer's interpretation on the aforesaid event(s) shall be final and binding.	Sr. No.	Event	Period for which bid(s) shall be considered as non-responsive/ not eligible	1.	Termination of Contract due to Contractor's default	1 year	2.	Encashment of CPG due to non-performance	1 year	3.	Repeated failure of major Equipment while in service	1 year	4.	Substantial portion of works (more than 50% of the Contract*) is sub-contracted, under an existing Contract	1 year	5.	More than 25% of the Contract price (awarded value), in aggregate, is paid to sub-contractors/suppliers as Direct payment, under an existing Contract, due to financial position of Contractor	1 year	6.	Firm has been referred to NCLT under Insolvency & Bankruptcy Code (<i>IRP has been appointed or Liquidation proceedings have been initiated under IBC</i>)	Till the firm comes out of Resolution process
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5.	ITB 5.1	Insert the following after Sl. No. 19 20. Form of Bank Guarantee for Contract Performance (<i>to be submitted by the Bidder for Annual Maintenance part of the Contract after Defect Liability Period</i>) 21. Format of value-addition certificate on half-yearly basis (Sept 30 and March 31), duly certified by the Statutory Auditors of the																					

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		Domestic Manufacturer (to be submitted during contract execution) 22. Form of Joint Deed of Undertaking by the Collaborator / Associate alongwith the Bidder for successful performance of the System. 23. Form of Bank Guarantee for Contract Performance (To be submitted by Collaborator / Associate). 24. Format of Authorization Certificate issued by domestic manufacturer for selling Domestically Manufactured Iron & Steel Products 25. Format of Affidavit of Self certification regarding Domestic Value Addition in Iron & Steel Products
6.	ITB 5.4	Supplementing Sub Clause 5.4: The nonrefundable fee towards the cost of Bidding Documents shall be Rs.25,000/-
7.	ITB 5.5	<u>Replace ITB 5.5 in BDS with the following:</u> Micro and Small Enterprises (MSEs) registered with Udyam Registration Portal as specified by Ministry of Micro, Small and Medium Enterprises are exempted from submission of fee towards the cost of Bidding Documents as per the Provisions of the Public Procurement Policy for Micro and Small Enterprises (MSEs) order 2012, Notification dated 01/06/2020 and 26/06/2020 read in conjunction with related notifications issued from time to time for such enterprises. This shall be subject to submission of 'Udyam Registration certificate' with regard to registration with authority mentioned above in accordance with the relevant notifications/orders. In case of bid submitted by a Joint Venture of two or more firms as partners, if allowed as per stipulated Qualification Requirements in Annexure-A (BDS), all partners of the joint venture shall be MSEs to consider its bid as bid from MSE. Further, JV bidder with at least one non-MSE partner (whether lead or other partner) shall not be eligible for the benefit available to the MSE bidders.
8.	ITB 6.1	Address of the Employer: Power Grid Corporation of India Limited, 'Saudamini', Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001. Kind Attn.: Sr. General Manager (CS) / Sr. DGM (CS-G7)/ Manager (CS-G7) (Thru Board) +91-124-282- 2397/3313/2353 Mobile: +91- 9910378008/ 9971399074/9599814162

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		Fax Nos.:- +91-124-2571 831 Email Address: edward@powergrid.in; nrapendra@powergrid.in rmendhe@powergrid.in
9.	ITB 6.1	Replace line 9 to 14 of para 6.1 as below: The Employer will respond through the portal https://etender.powergrid.in to any request for clarification or modification of the Bidding Documents that it receives no later than Seven (07) days prior to the original deadline for submission of bids prescribed by the Employer.
10.	ITB 6.4	Supplementing Clause ITB 6.4 with the following: <u>Venue, date and time for Pre-bid Meeting:</u> The Bidder's designated representatives are invited to attend a pre-bid meeting, which will take place through Video Conferencing. The web link to join the meeting is as follows: https://teams.microsoft.com/l/meetup-join/19%3ameeting_ZGQ1ZGQ2ODEtYWMzNC00OTI1LWJiYTQtNjI1Y2MzZjA3ODIw%40thread.v2/0?context=%7b%22Tid%22%3a%227048075c-52c2-4a40-8e7c-5c5a5573c87f%22%2c%22Oid%22%3a%22b1dca229-7f82-407a-95c6-ded2d1f4eafe%22%7d Date of pre-bid conference : 08/12/2023 Time: 1130 Hours (IST) onwards Kind Attn.: Sr. General Manager (CS) / Sr. DGM (CS-G7)/ Manager (CS-G7) Power Grid Corporation of India Limited 'Saudamini', 3rd Floor, Plot No.-2, Sector-29 Gurgaon (Haryana) - 122001. (Thru Board) +91-124-282- 2397/3313/2353 Mobile: +91- 9910378008/ 9971399074/9599814162 Fax Nos.:- +91-124-2571 831 Email Address: edward@powergrid.in; nrapendra@powergrid.in rmendhe@powergrid.in
11.	ITB 9	Supplementing ITB clause 9 For this package, Bid from Joint Venture is not permitted.
12.	ITB Clause 9 I (viii)	Supplementing Sub-Clause ITB 9 I (viii) with the following:

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		(a) Bidders shall also submit (i) Affidavit of Self certification regarding Minimum Local Content, if applicable, duly signed and stamped on each page (ii) Certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content, if applicable, duly signed and stamped on each page, in line with PPP-MII Order, MoP Order and DoT order. (b) Joint Deed of Undertaking by the Collaborator / Associate along with the Bidder for successful performance of the System. [If Applicable, refer Clause 2.2 (B) in Annexure-A(BDS)].
13.	ITB Clause 9.1 (b) vii	Supplementing Sub-Clause ITB 9.1(b) (vii) with the following: (a) Bidders shall also submit (i) Affidavit of Self certification regarding Minimum Local Content, if applicable, duly signed and stamped on each page (ii) Certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content, if applicable, duly signed and stamped on each page, in line with PPP-MII Order, MoP Order and DoT order. (c) Joint Deed of Undertaking by the Collaborator / Associate along with the Bidder for successful performance of the System. [If Applicable, refer Clause 2.2 (B) in Annexure-A(BDS)].
14.	ITB 9.2	Alternative bids shall not be permitted
15.	ITB 9.3 (a)	Replace ITB 9.3 (a) with following: (a) Attachment 1: Not Applicable
16.	ITB 9.3 (c)	Replace ITB 9.3 (c) with the following Attachment 3: Bidder's Eligibility and Qualifications (<i>Uploading of Scanned Copies of documentary evidence in support of Bidder's qualification. In case of Joint Venture bid, submission of Hard Copy in "Original" of the JV Agreement and POA for JV</i>)

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		 However, if the bidder resorts to unethical practices inter-alia including misrepresentation of facts, submission of false and/or forged details/ documents/ declaration as above, the bidder may be debarred from the participation in Employer's tenders for a period of 1 to 3 years, as considered appropriate and its Contract Performance Guarantee shall be forfeited besides taking other actions as deemed appropriate inter-alia considering bid submitted by the Bidder in future packages as non-responsive in line with ITB 13.6.
17.	ITB 9.3 (o)	Supplementing ITB clause 9.3(o) with the following: Integrity Pact must be submitted in physical form at the address given at ITB 16.2 a) at or before 1100 Hrs. on 05/01/2024.
18.	ITB 9.3 (v) to 9.3 (w)	Add new Clauses ITB 9.3(v), ITB 9.3(w), ITB 9.3 (x), ITB 9.3 (y), ITB 9.3 (z), ITB 9.3(aa) and ITB 9.3(bb) as follows: (v) Attachment 21: Undertaking by the bidder regarding Compliance of DMI&SP policy Vide Notification dated 8th May 2017 and its revision dated 29th May 2019 by Ministry of Steel has published "<i>Policy for providing preference to Domestically Manufactured Iron & Steel Products in Government Procurement</i>" (hereinafter DMI&SP policy). The bidder shall comply with the guidelines specified in the policy, including subsequent amendments/ modifications, if any. In support of the adherence, the bidder shall furnish in its bid an Undertaking declaring that bidder shall comply with the requirement of DMI&SP policy including its subsequent amendments issued from time to time. Further, bidder shall undertake that in case of award, requisite Affidavit of self-certification regarding Domestic Value Addition and/or Authorization certificate from the domestic manufacturer/ supplier of iron and steel products (<i>whose HS codes are falling in Appendix-A of the DMI&SP policy as revised from time to time</i>) included in the BoQ/ scope of the package shall be submitted by bidder to Employer before supply of the said iron and steel products required under the contract. Bidder's failure to submit the 'Undertaking by the bidder regarding Compliance of DMI&SP policy' along with the Bid or subsequently pursuant to ITB Sub-Clause 21.1 shall lead to outright rejection of the Bid.

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		Further, violation to minimum prescribed domestic value addition or misrepresentation of facts by the bidder in this regard shall be dealt in line with provisions of the Integrity Pact signed between the bidder and POWERGRID. (w) Attachment 22: Affidavit of Self certification regarding Minimum Local Content in line with PPP-MII Order, MoP Order and DoT Order, if applicable (<i>submission of Hard Copy in 'Original'</i>), to be submitted on a non-judicial stamp paper of Rs. 100/-by an Indian Bidder and foreign Bidder may submit the Affidavit on its company's letterhead. In line with the PPP-MII Order, MoP Order and DoT Order, the bidder shall submit the Affidavit of self-certification, in original, certifying that the item offered meets the Minimum Local Content and shall give details of the location(s) at which value addition is made, as prescribed in the PPP-MII Order, MoP Order and DoT Order, on a non-judicial stamp paper of Rs. 100/-. Further, Self certification submitted by the Bidder may be verified randomly by the committee constituted as per PPP-MII Order, MoP Order and DoT Order. In case of false documents / misrepresentation of the facts, requisite action against such Bidder will be taken based on the recommendation of the Committee and in line with provisions of the Integrity pact. Bidder may note that the other directions of Nodal Ministry as identified under PPP-MII Order shall also be suitably considered in regard to verification/action of the certificate. (x) Attachment 23: Certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content, in line with PPP-MII Order, MoP Order and DoT Order, if applicable (<i>submission of Hard Copy in 'Original'</i>) to be submitted on the letter head of the auditor/ cost accountant/chartered accountant. In line with the PPP-MII Order, MoP Order and DoT Order, the bidder shall submit certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content, if applicable, on the letter head of the auditor/chartered accountant. Further, auditor's/ accountant's certificates (as the case may be) submitted by the Bidder may be may be verified randomly by the

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		committee constituted as per PPP-MII Order, MoP Order and DoT Order. In case of false documents / misrepresentation of the facts, requisite action against such Bidder will be taken based on the recommendation of the Committee and in line with provisions of the Integrity pact. Bidder may note that the other directions of Nodal Ministry as identified under PPP-MII Order shall also be suitably considered in regard to verification/action of the certificate. (y) Attachment 24: Compliance to the process related to the e-RA Terms & Conditions and the Business Rules governing the e-RA. (z) Attachment 25: Declaration by the Bidder regarding events encountered pursuant to ITB Clause 2.1 (aa) Attachment 26: Certification by the Bidder as per DoE Order in line with ITB Clause 2.1 (bb) Attachment 27: Bid Securing Declaration to be submitted by the Bidder.
19.	ITB 11.3	Replace the ITB Clause 11.3 with the following: Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules. Where no Price Schedules are included in the Bidding Documents, Bidders shall present their prices in the following manner: Separate numbered Schedules shall be used for each of the following elements. The total amount from each Schedule 1 to 5 shall be summarized in a grand summary of Price Proposal (Schedule 6) giving the total bid price(s) to be entered in the Bid Form. Schedule 1: Plant and Equipment (including mandatory Spares) to be supplied including Type Test Charges Schedule 2 Local Transportation, In-transit Insurance, Loading and unloading Schedule 3 Installation Services Schedule 4a Charges for Training to be imparted Schedule 4b Maintenance Charges during Defect Liability Period and Annual Maintenance Charges after Defect Liability Period Schedule 5 Taxes and Duties not included in Schedule 1 to 4

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		Schedule 6 Grand Summary (Schedule Nos. 1 to 5) Schedule 7 Break-up of Type Test Charges Bidders shall note that the plant and equipment included in Schedule No. 1 above exclude materials used for civil, building and other construction works. All such materials shall be included and priced under Schedule No. 3, Installation Services.
20.	ITB 11.4 (d)	Renumber ITB clause 11.4 (e) as 11.4 (d)
21.	ITB 11.4(d)	Replace Clause ITB 11.4 (d) with the following: The Training Charges shall be furnished separately in Schedule-4a for the training. The price quoted in respect of all items in the above schedule shall be excluding GST.
22.	ITB 11.4(d)	Insert new ITB clause 11.4 (e) The break-up of Annual Maintenance Charges (AMC) for 1 year during Defect Liability Period and for 6 years after Defect Liability Period shall be furnished in Schedule 4b. The price indicated in respect of all items in Schedule 4b shall be excluding GST, if any, payable.
23.	ITB 11.5	Replace the existing provision with the following: The prices shall be in accordance with the following: Fixed Price. Prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.
24.	ITB 13.1	Bid Security shall not be applicable in this Package. All the Bidders shall submit as part of their bid, a Bid Securing Declaration in Attachment-27 of the Bid Forms.
25.	ITB 13.2	Deleted
26.	ITB 13.3	Replace ITB 13.3 with following: Bidder's failure to submit an acceptable Bid Securing Declaration along with the bid or subsequently pursuant to ITB Clause 21.1, shall lead to his bid being considered nonresponsive in line with ITB Sub-Clause 22.4. The Bid Securing Declaration of a joint venture must be in the name of all the partners in the joint venture submitting the bid.

Sl. No.	ITB Clause Ref. No.	Bid Data Details
27.	ITB 13.4 and 13.5	Deleted.
28.	ITB 13.6	Replace ITB 13.6 with following: In case of dishonouring the conditions of Bid Securing Declaration as given below, the bids from such Bidders shall be considered as non-responsive for any package whose originally scheduled date of bid opening/actual date of bid opening (First Envelope or Second Envelope) falls within the specified period of non-responsiveness/ineligibility. This period of ineligibility shall be 1 year reckoned from the date of issuance of communication from the Employer to this effect. (a) if the Bidder withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form; or (b) In case the Bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid and/or accept the withdrawals/rectifications pursuant to the declaration/confirmation made by him in Attachment – Declaration of the Bid; or (c) If a Bidder does not accept the corrections to arithmetical errors identified during preliminary evaluation of his bid pursuant to ITB Sub-Clause 27.2; or (d) If, as per the requirement of Qualification Requirements the Bidder is required to submit a Deed of Joint Undertaking and he fails to submit the same, duly attested by Notary Public of the place(s) of the respective executant(s) or registered with the Indian Embassy/High Commission in that Country, within ten days from the date of intimation of post – bid discussion; or (e) in the case of a successful Bidder, if the Bidder fails within the specified time limit (i) to sign the Contract Agreement, in accordance with ITB Clause 34, or (ii) to furnish the required performance security(ies), in accordance with ITB Clause 35 and/or to keep the bid security valid as per the requirement of ITB Sub-Clause 13.5.
29.	ITB 13.7	Deleted
30.	ITB 14.2	Replace ITB 14.2 with following: In exceptional circumstance, the Employer may solicit the Bidder's

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		consent to an extension of the bid validity period. The request and responses thereto shall be made in writing or by cable. A Bidder may refuse the request, in which case provision of non-responsiveness in future packages as per ITB 13.6 shall not be applicable A Bidder granting the request will not be required or permitted to modify its bid.
31.	ITB 15.1 (ii) (g)	Supplementing ITB clause 15.1 (ii)(g) with the following: (h) Affidavit of Self certification regarding Minimum Local Content, if applicable, duly signed and stamped on each page and Certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content, if applicable, duly signed and stamped on each page, in line with PPP-MII Order, MoP Order and DoT order. (j) Joint Deed of Undertaking by the Collaborator / Associate along with the Bidder for successful performance of the System. [If Applicable, refer Clause 2.2 (B) in Annexure-A(BDS)].
32.	ITB 16.1	Supplementing Envelope-4 of ITB 16.1 with the following: Affidavit of Self certification regarding Minimum Local Content under PPP-MII Order, MoP Order and DoT order, if applicable, Certificate from statutory auditor/cost auditor/cost accountant/chartered accountant, giving the percentage of Local Content, under PPP-MII Order, MoP Order and DoT order, if applicable.
33.	ITB 16.2(a), ITB 16.2(b), ITB 17.1, 18.1, and ITB 20.1	The deadline for <u>Soft copy part of the bid</u> submission is Date: 03/01/2024 [Time: 11:00 hours [Indian Standard Time (e-procurement server time)]. Bid submission timelines will be defined as per the e-Procurement server clock only. Address for submission of Hard copy of Documents; Address in Person or by Post: Sr. Deputy General Manager / Manager (CS-G3), Power Grid Corporation of India Limited, 'Saudamini', Plot No. 2, Sector - 29, 3rd Floor, Gurgaon (Haryana) – 122001 INDIA The deadline for submission of Hard copy part of the bid is as under:

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		Date: 05/01/2024 Time: 11:00 hours (Indian Standard Time) Address for Bid Opening: POWER GRID CORPORATION OF INDIA LTD. “SAUDAMINI”, Third Floor, Plot No.2, Sector-29, Gurgaon, Haryana – 122 001. Time and date for Bid Opening – First Envelope: Date : 05/01/2024 Time: 11:30 hours (Indian Standard Time) (a) Bid Title: (insert Name of the Package & Specification No.) <u>FIRST ENVELOPE</u> (a) Do not open before 11:30 hours (Indian Standard Time) on ____ / ____ /20xx.
34.	ITB 17.1	Supplementing ITB clause 17.1 with the following: Hard copy of ‘Joint Deed of Undertaking by the Collaborator / Associate along with the Bidder for successful performance of the System’, must be received by the Employer at the address specified under ITB Sub-Clause 16.2 no later than the time and date stated in the BDS.
35.	ITB 17.2.1	Supplementing ITB clause 17.2.1 with the following: The e-mail IDs are as follows: Email Address: edward@powergrid.in; nrapendra@powergrid.in rmendhe@powergrid.in
36.	ITB 19.4	No bid may be withdrawn in the interval between the bid submission deadline and the expiration of the bid validity period specified in ITB Clause 14. Withdrawal of a bid during this interval may result in the Bidder’s bids in future packages being considered non-responsive, pursuant to ITB Sub-Clause 13.6
37.	ITB 21.1	Replacing first Para of ITB clause 21.1 with the following: During bid evaluation, the Employer may, at its discretion, ask the Bidder for a clarification of its bid. In case of erroneous/non submission of documents related to/identified in ITB Sub-Clause 9.3 (b), (o), (s), (t), (u), (v),(w),(x), (y), (z), (aa) and (bb) or Deed of Joint Undertaking pursuant to ITB Sub-Clause 9.3 (c) & (e) or the complete annual reports

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		together with Audited statement of accounts pursuant to ITB Sub-Clause 9.3 (c), Demand Draft or Online Payment Acknowledgement towards the cost of Bidding Documents pursuant to ITB 5.4, documentary evidence with regard to registration with designated Authority of GoI under the Public Procurement Policy for MSEs pursuant ITB 5.5, documentary evidence with regard to MSE owned by SC/ST entrepreneurs or women in line with Public Procurement Policy for MSEs pursuant to ITB 9.3(p), required to be submitted by the Bidder as per the provisions of the Bidding Documents, the Employer may give the Bidder not more than 7 working days notice to rectify/furnish such documents, failing which the bid shall be rejected. The request for clarification and the response shall be in writing, and no change in the price or substance of the bid shall be sought, offered or permitted.
38.	ITB 22.3.1	Replacing ITB clause with the following: Bids containing deviations from critical provisions relating to GCC Clauses 2.14 (Governing Law), 5.1 (Contractor's Responsibility), 8 (Terms of Payment), 9.3 (Performance Security), 10 (Taxes and duties), 21.2 (Completion Time Guarantee), 22 (Defect Liability), 23 (Functional Guarantee), 25 (Patent Indemnity), 26 (Limitation of Liability), 38 (Settlement of Disputes), 39 (Arbitration), 40 (Conciliation) and Appendix 2 to the Form of Contract Agreement (Price Adjustment) will be considered as non-responsive.
39.	ITB 23.2	Supplement ITB clause 23.2 with the following: 23.2.1 The determination shall also take into account the assessment of Bid Capacity of a bidder before considering them for award of contract(s). Such Bid Capacity for regulating award of contract(s) on a bidder during any Financial Year (i.e. April to March) shall be subject to the condition that aggregate of the annualized requirement specified at para A, B, & C below, which corresponds to various packages to be considered for award [shall mean the package(s) for which award has been placed on that Bidder/ Bidder is under the zone of consideration for award of the package(s)] during such Financial Year (i.e. April to March), shall not exceed 1.5 (one and half) times the Average Annual Turnover (AAT) of the Bidder worked out in the manner as specified in Qualification Requirement for the Bidder (Annexure-A(BDS), Section-III, Volume-I of Bidding Documents): A. For packages under TBCB: 40% of Minimum Average Annual Turnover (MAAT) requirement specified in Qualification Requirement (Annexure-A(BDS), Section-III, Volume-I of Bidding Documents) shall be considered for analyzing the available Bid Capacity till POWERGRID

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		emerges as the successful bidder of the TBCB project. Thereafter, 100% of such value worked out based on the Award value of the package shall be considered for analyzing the available Bid Capacity. B. For packages* whose actual date of opening of First Envelope/Technical bids is on or before 23rd September 2023: For all such packages, Minimum Average Annual Turnover (MAAT) requirement specified in Qualification Requirement (Annexure-A(BDS), Section-III, Volume-I of Bidding Documents) of the package(s) shall be divided by a normative figure of 1.18 for considering the same for above purpose. <i>*excluding those packages under TBCB wherein POWERGRID has emerged as the successful bidder of the TBCB project.</i> C. For packages other than those covered under (A) and (B) above: Minimum Average Annual Turnover (MAAT) requirement specified in Qualification Requirement (Annexure-A(BDS), Section-III, Volume-I of Bidding Documents) of the package shall be considered for analyzing the available Bid Capacity of the bidder. 23.2.1.1 The Employer may, seek clarification/ details related to Balance Bid Capacity, as may be considered appropriate. 23.2.2 Notwithstanding the above, in case any of the event(s) as per ITB Clause 2.1 is encountered afresh even prior to opening of Second Envelope/Price Part Bid of any package, the bid of such bidder shall be considered as non-responsive/not eligible for that package. For the above purpose, the bidder shall also submit a declaration in Attachment 25. 23.2.3 Notwithstanding the declaration by the bidder as above, the Bid Capacity/ Manufacturing Capacity shall be subject to assessment, if any, by the Employer. 23.2.4 The Bidder shall note that if at any stage, they have been found to resort to unethical practices inter-alia including any misrepresentation of facts, submission of false and/ or forged details/ documents/ declaration as above, the bidder may be debarred from the participation in Employer's tenders for a period of 1 to 3 years, as considered appropriate and its Contract Performance Guarantee shall be forfeited besides taking other actions as deemed appropriate.

Sl. No.	ITB Clause Ref. No.	Bid Data Details	
40.	ITB 24.1 (c)	The Time for Completion	
		Activities	Duration in months from the effective date of Contract
		Taking Over by the Employer upon successful Completion of:	
		Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR). Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830	20 (Twenty Months)
41.	ITB 27.2	Replace the last para of ITB 27.2 with the following: If the Bidder does not accept the correction of errors as per this clause, its bid will be rejected and the bid submitted by the Bidder for futures packages will be considered non-responsive in line with ITB 13.6.	
42.	ITB 27.4 (b)	Deleted as Functional Guarantees are not applicable.	
43.	ITB 27.4(c)	Bidder shall confirm the guaranteed performance or efficiency in response to the Technical Specifications. Plant & Equipment offered shall have a minimum (or maximum, as the case may be) level of performance guarantees specified in Technical Specification to be considered responsive.	
44.	ITB 27.5 (b)	Deleted as Functional Guarantees are not applicable.	
45.	ITB 27.5 (c)	For the purpose of evaluation, no adjustment to the bid price towards performance guarantees of the Equipments is applicable. However, the provision of Technical Specification, Volume-II of the Bidding Documents and Clause ITB 27.4 (c) shall prevail.	
46.	ITB 28.1	Supplementing Sub Clause ITB 28.1 with the following: No purchase preference is presently applicable for the Plant and Equipment to be supplied under the Contract.	
47.	ITB 28.2	Add a new Sub Clause ITB 28.2 as under: No margin of domestic preference will be allowed in evaluation and comparison of bids.	
48.	ITB 29	Replacing ITB clause 29 29. e-Reverse Auction (e-RA) 29.1 The Employer reserves the right to conduct e-Reverse Auction (e-RA) for further reduction in the price. In case e-RA is conducted, same shall be done in the manner as indicated at	

Sl. No.	ITB Clause Ref. No.	Bid Data Details
		Annexure-B(BDS). For the purpose of the aforesaid, the 'Indicative Estimated Cost for e-RA' is INR 94.96 Crore. Further, Business Rules for e-Reverse Auction and a sample format for e-Reverse Auction Notice is enclosed at Annexure-C (BDS). Note:- POWERGRID have made arrangements with M/s MJUNCTION SERVICES LTD, who will be POWERGRID's authorized Application Service Provider (ASP) for e-Reverse Auction. The bidders shortlisted for e-RA, must have registration on Mjunction portal https://auction.buyjunction.in for participation in e-RA. For registration, shortlisted bidders required to contact M/s MJunction Services Limited, at following address to complete the registration formalities: M/s. Mjunction Services Ltd 3rd Floor, Tower – 1, Godrej water Side, Plot – V, Block – DP, Sector – V, Salt Lake, Kolkata – 700091 Contact person: Ms. Rimi Ghosh, Mb. 9650044156 E-mail : rimi.ghosh@mjunction.in The said registration on the Mjunction portal is free of cost for the bidders.
49.	ITB 31.2	Replace the existing provisions with the following: The Employer may request the Bidder to withdraw any of the deviations listed in the winning bid. At the time of Award of Contract, if so desired by the Employer, the bidder shall withdraw the deviations listed in Attachment 6 to the First Envelope at the cost of withdrawal stated by him in the bid. In case the bidder does not withdraw the deviations proposed by him, if any, at the cost of withdrawal stated by him in the bid, his bid will be rejected and the bids submitted by such Bidder in future packages will be considered non-responsive in line with ITB 13.6. Bidder would be required to comply with all other requirements of the Bidding Documents except for those deviations which are accepted by the Employer.
50.	ITB 31.4.1	Replace ITB 31.4.1 with the following: The award shall be made as follows: (i) First Contract (<i>Supply of Goods</i>): For Ex-works supply of all

Sl. No.	ITB Clause Ref. No.	Bid Data Details			
		equipments and materials including mandatory spares and Type Tests to be conducted (whether in India or abroad) (ii) Second Contract (<i>Supply of Services</i>): For providing all services i.e. inland transportation for delivery at site, In-transit insurance, loading, unloading, handling at site, installation, Testing and Commissioning including performance testing in respect of all the equipments supplied under the "First Contract", Training to be imparted (whether in India or abroad) and any other services specified in the Contract Documents. Annual Maintenance (AMC) for 1 year during Defect Liability Period and for 6 years after Defect Liability Period shall be part of Second Contract mentioned above. Both contracts will contain a cross fall breach clause specifying that breach of one will constitute breach of the other.			
51.	ITB 35.1	Supplementing Sub Clause 35.1 with the following: In addition to the Performance Security of 10% of the Contract Price, the successful bidder is required to furnish additional performance security(ies), if applicable as per stipulated QR/Clause no. 4 of Joint Deed of Undertaking mentioned at Sl. No. 22 of Section – VI : Sample Forms and Procedures.			
52.	ITB 35.2	Replace ITB 35.2 with the following: Failure of the successful Bidder to comply with the requirements of ITB Clause 34 or Clause 35 shall constitute sufficient grounds for the annulment of the award and the bids submitted by such Bidder in future packages shall be considered non-responsive in line with ITB 13.6, in which event the Employer may make the award to the next lowest evaluated Bidder or call for new bids.			
53.	General	Price Schedules provided in MS excel format shall be filled and uploaded on e-procurement portal viz. PRANIT Portal (https://etender.powergrid.in) by Bidder in line with the provisions of Bidding Documents. Bidder is also required to fill Schedule wise total price of each of the schedule in the corresponding line items under the 'Items' tab on e- <table border="1"> <tr> <td>Price Schedule as per Volume-III</td><td>Corresponds to</td><td>Corresponding Line Item under 'Items' tab on PRANIT Portal in which Total Price of the schedule is to be filled</td></tr> </table> procurement portal viz. PRANIT Portal (https://etender.powergrid.in) for the purpose of Bid Price Summary and Bid Comparison statement as per below:	Price Schedule as per Volume-III	Corresponds to	Corresponding Line Item under 'Items' tab on PRANIT Portal in which Total Price of the schedule is to be filled
Price Schedule as per Volume-III	Corresponds to	Corresponding Line Item under 'Items' tab on PRANIT Portal in which Total Price of the schedule is to be filled			

Sl. No.	ITB Clause Ref. No.	Bid Data Details		
		Schedule 1: Plant and Equipment (including mandatory Spares) to be supplied including Type Test Charges	Schedule 1	TOTAL EXWORKS AMOUNT
		Schedule 2: Local Transportation, In-transit Insurance, Loading and unloading	Schedule 2	TOTAL FREIGHT AND INSURANCE CHARGES
		Schedule 3: Installation Services	Schedule 3 & Schedule 4b	TOTAL INSTALLATION SERVICE AMOUNT
		Schedule 4b: Maintenance Charges during & after Defect Liability Period		
		Schedule 4a : Charges for Training to be imparted	Schedule 4a	TOTAL TRAINING CHARGES
		Schedule 5: Taxes and Duties applicable in Schedule 1 above	Schedule 5	TOTAL GST ON GOODS
		Schedule 5: Taxes and Duties applicable in Schedule 3, 4a & 4b above	Schedule 5	TOTAL GST ON SERVICES
54.	Note- At the time of submission of the bid, Bidders are required to make sure that: 1. The First Envelope excel with file named “First Envelope and Bid Forms” must be uploaded alongwith the bid. 2. The Second Envelope excel with file named “Price_schedule” must be uploaded alongwith the bid. As per the provisions of the portal, it is mandatory to upload aforesaid excel files with name as indicated above (<i>Bidders may refer user manuals at the portal https://etender.powergrid.in regarding submission of bid</i>).			

----- End of Section-III (BDS) --

Qualifying Requirements (QR) for Package-I: Unified Network Management System (UNMS) for Central Sector & State Sector Communication in Western Region (WR).

Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830

1.1 QUALIFICATION CRITERIA:

Qualification of bidders will be based on meeting the minimum pass/ fail criteria specified below regarding the Bidder's technical experience and financial position as demonstrated by the Bidder's responses in the corresponding Bid Schedules. Technical experience and financial resources of any proposed subcontractor shall not be taken into account in determining the Bidder's compliance with the qualifying criteria except for the requirement stipulated herein clause 2.0 below. The bid can be submitted by an Individual firm only.

The owner may assess the capacity and capability of the bidder, to successfully execute the scope of work covered under the package within stipulated completion period. This assessment shall inter-alia include (i) document verification; (ii) bidders works/manufacturing facility visit; (iii) details of works executed, works in hand, anticipated in future & the balance capacity available for the present scope of work; (iv) Testing facilities, manpower and financial resources; (v) details of quality systems in place; (vi) past experience and performance; (vii) customer feedback including visit to sites; (viii) banker's feedback etc.

2.0 TECHNICAL EXPERIENCE

2.1 (A) Bidder must have its own Unified Network Management System (UNMS)/Operational Support System (OSS) product and must have designed, supplied, installed, tested and commissioned at least two (02) nos. UNMS/OSS Projects in the last seven (7) years and at least one of the above projects must be in successful* operation for at least one (1) year as on **originally scheduled last date of bid submission (soft copy) i.e. 03/01/2024.**

2.1 (B) UNMS Product in each of the above projects must have following:

- a. Integration with Management System (EMS/NMS) of either of the transmission technologies SDH/PDH/DWDM/CWDM/MPLS/GPON/PTN/ASON of at least two (2) OEMs and 500 Network Elements (NEs)
- b. Implementation of following functionalities
 - (i) Fault Management & Route Cause Analysis (RCA)
 - (ii) Performance Management
 - (iii) Consolidated Reporting & Dash Boarding

2.2 A Bidder not meeting the requirement stipulated at 2.1 above can also be considered qualified provided that:

- (A) The bidder must have installed, tested & commissioned at least one UNMS/OSS project meeting the requirements at 2.1(B) as a prime contractor# in the last seven (7) years which must be in successful* operation for at least one (1) year as on originally scheduled last date of bid submission (soft copy) mentioned above.

And

- (B) The bidder must have an association with a firm who has its own UNMS/OSS product which have been installed & commissioned in at least two (2) UNMS/OSS project in the last seven (7) years meeting the requirement mentioned at 2.1(B) above and of which at least one project is in successful* operation for at least one (1) year as on originally scheduled last date of bid submission (soft copy) mentioned above. The Bidder shall furnish a joint deed of undertaking executed by him and his associate for the successful performance of the entire system as per the format specified in Section - VI: Sample Forms and Procedures, of the Bidding Documents along with additional Contract Performance Guarantee equivalent to 10% of the Ex-works cost of UNMS from the associate firm whose product is being offered.

In case, the bidder is a holding company, the technical experience referred to in clause 2.1 & 2.2 above shall be of that holding company only (i.e. excluding its subsidiary/ group companies). In case bidder is a subsidiary of a holding company, the technical experience referred to in clause 2.1 & 2.2 above shall be of that subsidiary company only (i.e. excluding its holding company).

Note-1 (): Successful operation means Certificate issued by the Employer (an end user) certifying the operation without any adverse remark.*

Note-2 (#): In case of works executed under a contract that had been awarded on a Joint Venture, the experience of individual Joint Venture partner shall be considered limited to the scope of that partner under the said contract.

3.0 FINANCIAL POSITION

- (a) Net Worth of the Bidder for last 3 financial years should be positive.
- (b) Minimum Average Annual Turnover #(MAAT) for the best three (3) years i.e. 36 months out of last five (5) financial years of the bidder should be at least **₹ 576.900 Millions.**

Note - "Annual gross revenue from operations/gross operating income as incorporated in the profit & loss account excluding other operative income/other income".

- (c) Bidder shall have Liquid Assets (LA) or / and evidence of access to or availability of credit facilities of not less than **₹ 96.150 Millions.**

Note-1: In case, the bidder is a holding company, the financial experience referred to in clause 3.0 above shall be of that holding company only (i.e. excluding its subsidiary/ group companies). In case bidder is a subsidiary of a holding company, the financial experience referred to in clause 3.0 above shall be of that subsidiary company only (i.e. excluding its holding company).

Note-2: Relaxation for Start-Ups^/ MSEs

Start-Ups^/ MSEs, meeting the specified requirements at Para 3.0(a) above in Financial Position shall also be considered qualified if they meet Eighty (80) % of the requirement

specified at Para 3.0 (b) & 3.0 (c) above in Financial Position.

^ Start-Ups as defined by DIPP, applicable as on the originally scheduled last date of bid submission (Soft copy).

4.0 The Bidder shall furnish documentary evidence in support of the qualifying requirements stipulated as above.

e-Reverse Auction (e-RA)

- (A) Based on “Evaluated Bid Price” determined pursuant to ITB Sub Clause 27.6, the Bids shall be ranked in ascending order as X1, X2, X3 etc....
- (B) The Indicative Estimated Cost for e-RA for the package(s) is as indicated at ITB 29.1 in BDS.
- (C) If the variation of lowest evaluated bidder’s price (X1) is less than or equal to +5% of the Indicative Estimated Cost for e-RA, then e-RA shall be conducted with all such bidders whose evaluated price falls in the range of 5% of the evaluated price of X1 bidder and whose evaluated price is also less than or equal to +5% of the Indicative Estimated Cost for e-RA.
- (D) If the variation of lowest evaluated bidder’s price (X1) is more than +5% of the Indicative Estimated Cost for e-RA:
 - a) **Based on “Evaluated Bid Price” determined pursuant to ITB Sub Clause 27.6, the Bidders shall be ranked in ascending order. Basis such ranking, the lowest ranked $N/2$ bidders (in case ‘N’ is even) or $(N+1)/2$ bidders (in case ‘N’ is odd), subject to minimum of two (02) bidders, shall be invited to participate in the e-Reverse Auction (e-RA), where ‘N’ is the number of responsive bidders whose bids have been found to be responsive and their “Evaluated Bid Price” has been determined in accordance with ITB Sub Clause 27.6. In case number of responsive bids is two (02), e-RA shall be conducted with both the bidders.**
- (E) The Applicable Ceiling Price for e-RA for bidders shall be their “Evaluated Bid Price” determined in accordance with ITB Sub Clause 27.6. During e-RA, the bidders shortlisted for participation in e-RA shall be permitted to place their prices lower than their Applicable Ceiling Price.
- (F) The e-RA shall be conducted on a designated electronic platform of any Application Service Provider (hereinafter referred to as “ASP”), for and on behalf of the Employer.
- (G) The ASP, as and when authorized by the Employer, will intimate the bidders regarding the details of electronic platform, procedure/ modality of e-RA process and other details, prior to e-RA.
- (H) Notwithstanding above, the bidder(s) who either do not submit the requisite compliances for e-RA or do not participate in e-RA, their original price bid as opened, if valid, shall be considered for evaluation.
- (I) Notwithstanding the e-RA conducted as aforesaid, POWERGRID reserves the right to hold negotiations with the bidder with lowest evaluated price after e-RA (L1 bidder).
- (J) The Employer shall be the sole judge in this regard.

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).

Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830.

Annexure-C (BDS)

EMPLOYER NAME	Power Grid Corporation of India Limited, 'Saudamini', 3rd Floor, Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001	
DATE & TIME OF REVERSE AUCTION	e-Reverse Auction Date :dd/mm/yyyy e-Reverse Auction Time: From aa Hrs (IST) To bb Hrs (IST)	
AUCTION TO BE CONDUCTED BY	M/s MJUNCTION SERVICES LTD 43, JAWAHAR LAL NEHRU ROAD TATA CENTRE, KOLKATA-700071 Contact person: Ms. Rimi Ghosh - 09650044156 E-mail: mj.pgclteam@mjunction.in ;	
POWERGRID OFFICIALS	Mr. _____ Power Grid Corporation of India Limited,'Saudamini', 3rd Floor, Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001 E-mail: _____@powergrid.in	Mr. _____ Power Grid Corporation of India Limited,'Saudamini', 3rd Floor, Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001 E-mail: _____@powergrid.in
VALUE OF MINIMUM DECREMENT	Rs. _____ or in the equivalent value of other currency. <i>(The Value of Minimum Decrement shall be intimated to all the successful bidders alongwith e-Reverse Auction Notice).</i>	
DOCUMENTS ATTACHED	PRICE CALCULATION SHEET (EXCEL SHEET)/ TEMPLATES (Attachment-I) <i>(Price Calculation Sheet (Excel Sheet)/ Templates shall be intimated to all the successful bidders alongwith e-Reverse Auction Notice).</i>	

Business Rules for e-Reverse Auction

POWERGRID propose to conduct e-Reverse Auction as per ITB Clause 29 for the subject package.

1. POWERGRID have made arrangements with M/s MJUNCTION SERVICES LTD, who will be POWERGRID's authorized **Application** Service Provider (ASP) for e-Reverse Auction. **Bidders are required to go through the guidelines given below and submit their acceptance to the same in Attachment-25 to their First Envelope bid.**
2. e-Reverse Auction (RA) will be conducted by **the ASP** from its Kolkata office, on pre-specified date and time (*which shall be intimated to all the successful bidders through e-Reverse Auction Notice*), while the bidders shall quote from their own offices/ place of their choice. Internet connectivity shall be ensured by the respective agencies themselves.
3. **ASP** shall arrange to demonstrate/ train (if not trained earlier) bidders' nominated person(s), without any cost. They will also explain all the Rules related to e-Reverse Auction/ Business Rules Document to be adopted along with bid manual. Bidders are required to give their compliance to it before start of bid process to POWERGRID/ASP. **Further, shortlisted Bidders at their own discretion may ask for additional training to use the e-RA platform well in advance before start of the e-RA event by contacting the ASP at any suitable time. All such additional trainings shall also be free of cost.**
4. POWERGRID will provide the template calculation sheet (Excel Sheet) **alongwith e-Reverse Auction Notice** which will help bidders to arrive at "Total Cost to POWERGRID" for the total scope including Custom Duty, GST, other taxes & duties, Price impact if any, commercial/ technical loading (if any) and loading on account of differential losses(if any). Bidders have to fill only green colored cells [i.e. CIF/Ex-works Price, Local Transportation, Insurance and other Incidental Services (including port clearance etc.), Installation Charges, Training Charges etc., as applicable] in the excel sheet (attached herewith). Rank of the bidders would be displayed as per the Total Cost to POWERGRID i.e. including Taxes and Duties payable by POWERGRID as per the provisions of the Bidding Document and including capitalization of differential losses & cost compensation on account of technical/commercial deviations, **if any. Bidders are advised to study template calculation sheet (Excel Sheet) and inform POWERGRID/ ASP about discrepancies in the template before start of the e-RA event.**

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).

Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830.

Annexure-C (BDS)

5. The start bid price (SBP) for e-Reverse Auction shall be the bidder's corrected price for the subject package which has been indicated in the template calculation sheet (excel sheet) **provided alongwith e-Reverse Auction Notice.**
6. Procedure of e-Reverse Auctioning: Dynamic Template Bidding (Rank Disclosed)
 - i. In '*Dynamic Template Bidding (Rank Disclosed)*', bidders shall enter the Lumpsum price in line with clause 4 above for the total scope for subject Package. **The minimum decrement, which a bidder can offer during e-RA, shall be intimated to all the successful bidders alongwith e-Reverse Auction Notice.**
 - ii. In the "Dynamic Bidding" tie bid is not allowed on L1 price, i.e. if any higher price ranked vendor places bid equal to L1 price their bid will be rejected. The bidder is required to click on "Rejected" to know the reason of bid rejection. In that case, the bidder will have to instantly reduce their price to submit lower quoted price otherwise the price will be considered as higher bid or rejected bid. (system does not support tie bids in this type of auction)
 - iii. The bid prices received under e-RA shall be evaluated on the basis of evaluation method specified in the bidding document and the final evaluated prices thus obtained shall be used for comparison of bids.
 - iv. In case bidders do not participate in Reverse Auction, their original price bids **opened, if valid**, shall be considered for evaluation.
 - v. In case the bidder submits more than one successive bid, the lowest bid will be considered as final offer of the bidder to sell/ execute the work.
7. Successful bidder (**after e-RA**) shall furnish price confirmation to POWERGRID, duly signed and stamped (without any new condition other than those already agreed before start of Reverse Auction) within an hour of conclusion of e-Reverse Auction.

In the above confirmation, the bidder shall furnish the break-up of final price quoted in Reverse Auction under individual head of the template [**i.e. CIF/Ex-works Price, Port handling & Custom clearance, Local Transportation, In-transit Insurance, loading and unloading, Installation Charges, Type Test Charges, Training Charges, Customs Duty, GST for supply of Goods and Installation Services etc., as applicable**] in line with price schedule (already available with them).

Unless other-wise stated in the above break-up, decrease in the price of individual head of the template shall be considered proportionately on all individual line items of the respective head of the price schedules.

In case, there is any variation between the final price quoted in Reverse Auction and the signed document received after Auction, the first i.e. Closing Price in Auction will be taken final offered price by the bidder.

Bidders will not be permitted to increase unit rate of any item submitted in their original bid.

8. **Auction shall be for a period of 120 minutes. Bidders shall be able to view the following on their screens along with the necessary fields during the auction.**
 - a. **Rank of the respective bidder**
 - b. **Bid Placed by the respective bidder.**
 - c. **Price of L1 bidder**

The L1 price would be visible to all the bidders who have placed valid bids. However, identity of the L1 bidder or any other bidder would not be disclosed during entire e-Reverse Auction process. In case any other bidder chooses to bid a lower price, such bidders shall be required to breach the prevailing L1 price by bidding a price lower than the prevailing L1 price by at least the amount of decrement mentioned in the business rules.

The bidding would continue with an auto extension of 20 minutes time if any bidder bids a price lower than that of the prevailing L1 bidder by at least the amount of the specified decrement within the 20 minutes of the e-Reverse Auction, to be the L1 bidder till the time there is no change in the prevailing L1 price within final 20 minutes.

Any bid received at the ASP server end subsequent to closure of the e-RA shall be summarily rejected and shall not be considered as a valid bid under whatsoever circumstances. For this purpose, the ASP server log shall prevail.

However, POWERGRID reserves the right to defer and/or resume e-RA if ASP server is down (i.e. inaccessible/ inoperative) for a prolonged period of time.

9. During Auction, if no bid is received within the specified time, POWERGRID, at its discretion, may decide to close the reverse auction process/ proceed with conventional mode of tendering (Evaluation of Part-II (Price bid) submitted by bidders earlier).
10. Bids once made by the bidder cannot be cancelled/ withdrawn. If any bidder backs out and not make the supplies/execute the work as per the offered

price, POWERGRID shall take appropriate necessary action as per the provisions of Bidding Document.

11. Each Bidder shall be assigned Unique User Name & Password by **ASP**. Bidders are advised to change the Password and edit the information in the Registration Page after the receipt of initial Password from **ASP** to ensure confidentiality. All bids made from the Login ID given to the bidder will be deemed to have been made by the bidder. **Bidder is also advised to log into the e-RA platform at least once before start of the e-RA event and keep its user credentials safe and secure. POWERGRID shall not extend or postpone the e-RA event if bidder is unable to login as it forgot user credentials.**
12. Consequent upon completion of e-Reverse Auction, POWERGRID's decision on award of contract shall be final and binding on all the bidders.
13. POWERGRID shall be at liberty to call the L1 bidder for further process/ negotiation/ cancel, **recall and issue a corrigendum** to the e-reverse auction process/ re-tender at any time, without assigning any reason thereof.
14. POWERGRID/ **ASP** shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause.
15. POWERGRID along with **ASP** can decide to reschedule or cancel any Auction; the bidders shall be informed accordingly.
16. The bidder shall not involve himself or any of his representatives in price manipulation of any kind directly or indirectly by communicating with other bidders.
17. The bidder shall not divulge either his bid or any other exclusive details of POWERGRID to any other party.
18. Other terms and conditions shall be as per the bidding documents and bidder's techno-commercial offer.
19. All bidders are required to submit Process Compliance Form in the prescribed format and acceptance to the terms/ conditions/ modalities given above to Service Provider before start of Reverse Auction, without which they will not be eligible to participate in e-Reverse Auction.

SECTION – IV

GENERAL CONDITIONS OF CONTRACT (GCC)

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GENERAL CONDITIONS OF CONTRACT (GCC)

Preamble

This Section (Section -IV) of the Bidding Documents [named as General Conditions of Contract (GCC)] provides all the rights and obligations of the parties under the Contract. This Section contains provisions that are to be used unchanged unless Section - V [named as Special Conditions of Contract (SCC)] states otherwise as any changes in GCC or any complementary information that may be needed has been shown in SCC. If there is a conflict between the provisions of Section - IV & Section - V, the provisions of Section - V shall prevail.

A. Definitions and Interpretation

1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned to them:

- (a) “Arbitrator” means the person or persons appointed by agreement between the Employer and the Contractor to make a decision on or to settle any dispute or difference between the Employer and the Contractor referred to him or her by the parties pursuant to GCC Sub-Clause 39.1 (Arbitration) hereof.
- (b) “Associate” means a party who has been conjoined by the Contractor to independently execute a pre-selected part of facilities of the contract and grant him the associated contractual rights and obligations, without diluting the overall responsibility of the contractor in respect of the Facilities under the contract.
- (c) “Collaborator” or “Parent Company” means the firms/corporations who has provided technological support to the manufacturer for establishing production line for the specific Equipment.
- (d) “Commissioning” means operation of the Facilities or any part thereof, if any, as per GCC Sub-Clause 1.1(e) by the Contractor as specified in the Technical Specifications, which operation is to be carried out by the Contractor as provided in GCC Sub-Clause 20.1.3 (Commissioning), for the purpose of Trial - Operation (GCC Sub-Clause 20.1.4).
- (e) “Completion” means that the Facilities (or a specific part thereof where specific parts are specified in the SCC) have been completed operationally and structurally and put in a tight and clean condition and that all works in respect of pre-commissioning of the Facilities (or a specific part thereof where specific parts are specified in the SCC) has been completed (wherever required, as per Technical Specifications) and Commissioning followed by Trail - Operation has been completed, as provided in GCC Sub-Clause 20.1 (Completion of Facilities) hereof.
- (f) “Contract” means the Contract Agreement entered into between the Employer and the Contractor together with the Contract Documents referred to therein.

- (g) “Contract Documents” means the documents listed in Clause 1.1 of Article 1 (Contract Documents) of the Form of Contract Agreement (including any amendments thereto).
- (h) “Contract Price” means the sum specified in Clause 2.1 of Article 2 (Contract Price) of the Contract Agreement, subject to such additions or deductions therefrom, as may be made pursuant to the Contract. For the purpose of Liquidated Damages and Contract Performance Guarantee, the “Contract Price” means the sum specified in Clause 2.1 of Article 2 (Contract Price) of the Contract Agreement.
- (i) “Contractor” means the firms whose bid to perform the Contract has been accepted by the Employer and is named in the Contract Agreement, and includes the legal successors or permitted assigns of the Contractor.
- (j) “Contractor’s Equipment” means all plant, facilities, equipment, machinery, tools, apparatus, appliances or things of every kind required in or for installation, completion and maintenance of Facilities that are to be provided by the Contractor, but does not include Plant and Equipment, or other things intended to form or forming part of the Facilities.
- (k) “Contractor’s Representative” means any person nominated by the Contractor and approved by the Employer in the manner provided in GCC Sub-Clause 13.2 (Contractor’s Representative and Construction Manager) hereof to perform the duties delegated by the Contractor.
- (l) “Day” means calendar day of the Gregorian Calendar.
- (m) “Defect Liability Period” means the period of validity of the warranties given by the Contractor commencing at Completion of the Facilities or a part thereof, if any, as per GCC Sub-Clause 1.1(e), during which the Contractor is responsible for defects with respect to the Facilities (or the relevant part thereof) as provided in GCC Clause 22 (Defect Liability) hereof.
- (n) “Effective Date” means the date of Notification of Award from which the Time for Completion shall be determined.
- (o) “Employer” means the firm/corporation/ government entity, named in the SCC, who is responsible for getting the Facilities implemented. The Employer may be Owner himself or an

agency appointed by the Owner and shall include the legal successors or permitted assigns of the Employer.

- (p) "Facilities" means the Plant and Equipment to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract.
- (q) "GCC" means the General Conditions of Contract hereof.
- (r) "Guarantee Test(s)" means the test(s) specified in the Technical Specifications to be carried out to ascertain whether the Facilities or a specified part thereof is able to attain the Functional Guarantees specified in the Technical Specifications in accordance with the provisions of GCC Sub-Clause 20.2.1 (Guarantee Test) hereof during/after successful Commissioning followed by Trial - Operation.
- (s) "Installation Services" means all those services ancillary to the supply of the Plant and Equipment for the Facilities, to be provided by the Contractor under the Contract; e.g., transportation and provision of marine or other similar insurance, inspection, expediting, site preparation works (including the provision and use of Contractor's Equipment and the supply of all construction materials required), installation, testing, precommissioning, commissioning, operations, maintenance, the provision of operations and maintenance manuals, training, etc.
- (t) "Month" means calendar month of the Gregorian Calendar.
- (u) "Notification of Award" means the official notice issued by the Employer notifying the Contractor that his bid has been accepted.
- (v) "Operational Acceptance" means the acceptance by the Employer of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts), which certifies the Contractor's fulfillment of the Contract in respect of Functional Guarantees of the Facilities (or the relevant part thereof) in accordance with the provisions of GCC Sub-Clause 20.2.2 (Operational Acceptance) hereof after successful Commissioning followed by Trial - Operation.
- (w) "Owner" means the firm/corporation/government entity, named in the SCC, who has decided to set up the Facilities and

shall includes the legal successors or permitted assigns of the Owner.

- (x) "Plant and Equipment" means permanent plant, equipment, machinery, apparatus, articles and things of all kinds to be provided and incorporated in the Facilities by the Contractor under the Contract (including the spare parts to be supplied by the Contractor under GCC Sub-Clause 3.3 hereof), but does not include Contractor's Equipment.
- (y) "Precommissioning" means the testing, checking and other requirements specified in the Technical Specifications that are to be carried out by the Contractor in preparation for Commissioning as provided in GCC Sub-Clause 20.1.2 (Pre-Commissioning) hereof.
- (z) "Project Manager" means the person appointed by the Employer in the manner provided in GCC Sub-Clause 13.1 hereof to perform the duties delegated by the Employer.
- (aa) "SCC" means the Special Conditions of Contract.
- (bb) "Site" means the land and other places upon which the Facilities are to be installed, and such other land or places as may be specified in the Contract as forming part of the Site.
- (cc) "Subcontractor"/"vendor"/"sub-vendor" means firms/corporations/government entities to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant and Equipment, is sub-contracted directly or indirectly by the Contractor with the consent of the Employer in writing, and includes its legal successors or permitted assigns.
- (dd) "Taking Over" means the Employer's written acceptance of the Facilities under the Contract, after successful Trial - Operation for the specified period in accordance with the Contract, as provided in GCC Sub-Clause 20.1.5.
- (ee) "Time for Completion" means the time within which Completion of the Facilities is to be attained in accordance with the specifications, as a whole (or of a part of the Facilities where a separate Time for Completion of such part has been prescribed in the SCC) and "Taking Over" by the Employer is to be attained.

2. Interpretation

2.1 Contract

2.1.1 The Contracts to be entered into with the successful Bidder shall be as under:

- (i) First Contract: For Ex works supply of all equipments and materials including mandatory spares and Type Test to be conducted (whether in India or abroad) (*Supply of Goods Contract*)
- (ii) Second Contract: For providing all services i.e. inland transportation for delivery at site, In-transit insurance, unloading, handling at site, installation, Testing and Commissioning including performance testing in respect of all the equipments supplied under the "First Contract", Training to be imparted (whether in India or abroad) and any other services specified in the Contract Documents (*Supply of Services Contract*).

2.1.2 The award of two separate Contracts shall not in any way dilute the responsibility of the Contractor for the successful completion of the facilities as per Specification and a breach in one Contract shall automatically be construed as a breach of the other Contract(s) which will confer a right on the Employer to terminate the other Contract(s) also at the risk and the cost of the Contractor.

2.1.3 The Contract will be signed in two originals and the Contractor shall be provided with one signed original and the rest will be retained by the Employer.

2.1.4 The Contractor shall provide free of cost to the Employer all the engineering data, drawing and descriptive materials submitted with the bid, in at least two (2) copies to form a part of the Contract immediately after Notification of Award.

2.2 Contract Documents

All documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory, subject to Article 1.2 (Order of Precedence) of the Contract Agreement. The Contract shall be read as a whole.

2.3 Language

The ruling language of the Contract and the language for communications shall be English.

2.4 Singular and Plural

The singular shall include the plural and the plural the singular, except where the context otherwise requires.

2.5 Headings

The headings and marginal notes in the General Conditions of Contract are included for ease of reference, and shall neither constitute a part of the Contract nor affect its interpretation.

2.6 Entire Agreement

Subject to GCC Sub-Clause 12.4 hereof, the Contract constitutes the entire agreement between the Employer and Contractor with respect to the subject matter of Contract and supersedes all communications, negotiations and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract.

2.7 Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party hereto.

2.8 Independent Contractor

The Contractor shall be an independent contractor performing the Contract. The Contract does not create any agency, partnership, joint venture or other joint relationship between the parties hereto.

Subject to the provisions of the Contract, the Contractor shall be solely responsible for the manner in which the Contract is performed. All employees, representatives or Subcontractors engaged by the Contractor in connection with the performance of the Contract shall be under the complete control of the Contractor and shall not be deemed to be employees of the Employer, and nothing contained in the Contract or in any subcontract awarded by the Contractor shall be construed to create any contractual relationship

between any such employees, representatives or Subcontractors and the Employer.

2.9 Joint Venture

If the Contractor is a joint venture of two or more firms, all such firms shall be jointly and severally bound to the Employer for the fulfillment of the provisions of the Contract and shall designate one of such firms to act as a leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior written consent of the Employer.

2.10 Non-Waiver

2.10.1 Subject to GCC Sub-Clause 2.10.2 below, no relaxation, forbearance, delay or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect or restrict the rights of that party under the Contract, nor shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

2.10.2 Any waiver of a party's rights, powers or remedies under the Contract must be in writing, must be dated and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

2.11 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

2.12 Country of Origin

"Origin" means the place where the materials, equipment and other supplies for the Facilities are mined, grown, produced or manufactured, and from which the services are provided. Plant and equipment are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

2.13 Notices

2.13.1 Unless otherwise stated in the Contract, all notices to be given under the Contract shall be in writing, and shall be sent by personal delivery, special courier, telegraph, facsimile or Electronic Data Interchange (EDI) to the address of the relevant party set out in the Contract Agreement, with the following provisions:

- (a) Any notice sent by telegraph, facsimile or EDI shall be confirmed within two (2) days after dispatch by notice sent by special courier, except as otherwise specified in the Contract.
- (b) Any notice sent by special courier shall be deemed (in the absence of evidence of earlier receipt) to have been delivered ten (10) days after dispatch. In proving the fact of dispatch, it shall be sufficient to show that the envelope containing such notice was properly addressed, stamped and conveyed to the postal authorities or courier service for transmission by special courier. Provided further that whenever the postal authorities or courier service provide a proof of delivery, the same shall also be applicable for presenting the fact of dispatch.
- (c) Any notice delivered personally or sent by telegraph, facsimile or EDI shall be deemed to have been delivered on date of its dispatch.
- (d) Either party may change its postal, facsimile or EDI address or addressee for receipt of such notices by ten (10) days' notice to the other party in writing.

2.13.2 Notices shall be deemed to include any approvals, consents, instructions, orders and certificates to be given under the Contract.

2.14 Governing Law & its Jurisdiction

The Contract shall be governed by and interpreted in accordance with laws of Union of India and the Courts of New Delhi shall have exclusive jurisdiction in all matters arising under this Contract.

B. Subject Matter of Contract

3. Scope of Facilities

3.1 Unless otherwise expressly limited in the Technical Specifications, the Contractor's obligation shall include the provision of all Plant

and Equipment and the performance of all Installation Services required for the design, the manufacture (including procurement, quality assurance, construction, installation, associated civil works, Precommissioning and delivery) of the Plant and Equipment and the installation, completion, commissioning and performance testing of the facilities in accordance with the plans, procedures, specifications, drawings, codes and any other documents as specified in the Technical specifications. Such specifications include, but are not limited to, the provision of supervision and engineering services; the supply of labour, materials, equipment, spare parts (as specified in GCC Sub-Clause 3.3 below) and accessories; Contractor's Equipment; construction utilities and supplies; temporary materials, structures and facilities; transportation (including without limitation, all clearances, handling etc.); storage and training except for those supplies, works and services that will be provided or performed by the Employer, as set forth in Appendix-6 (Scope of Works and Supply by the Employer) to the Contract Agreement

- 3.2 The Contractor shall, unless specifically excluded in the Contract, perform all such work and/or supply all such items and materials not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Completion of the Facilities as if such work and/or items and materials were expressly mentioned in the Contract.
- 3.3 The supply of Mandatory Spare Parts, if any, shall be included in the Contract. Beside the aforesaid Mandatory Spares parts, the Contractor shall ensure the availability of spare parts required for the operation and maintenance of the Facilities to the Employer for a minimum period of 15 years from Completion of the Facilities. The Contractor shall carry sufficient inventories to ensure an ex-stock supply of consumable spares for the plant and equipment. If so desired by the Employer, the Contractor shall submit the specifications, price and the terms and conditions relating to the supply thereof for such spares identified by the Employer with validity period of 6 months within 30 days of receipt of request from Employer for its consideration and placement of order.
- 3.4 The Contractor shall guarantee that in the event of termination of production of spare parts by the Contractor or his Sub-Contractor:
- (i) The Contractor shall send advance notification to the Employer of the pending termination, with 2 (two) years time to permit the Employer to procure needed requirements, and

- (ii) Following such termination, the Contractor shall furnish at no cost to the Employer the blueprints, drawings and specification of the spare parts, if requested.

3.5 In case the Contractor fails to supply the spares parts in accordance with the terms stipulated above, the Employer shall sanction the Contractor declaring them ineligible for a stated period of time for future projects.

4. Time for Commencement and Completion

4.1 The Contractor shall commence work on the Facilities from the Effective Date of Contract and without prejudice to GCC Sub-Clause 21.2 hereof, the Contractor shall thereafter proceed with the Facilities in accordance with the time schedule specified in the corresponding Appendix – 4 (Time Schedule) to the Contract Agreement.

4.2 The Contractor shall attain Completion of the Facilities (or of a part where a separate time for Completion of such part is specified in the Contract) within the time stated under Time for Completion or within such extended time to which the Contractor shall be entitled under GCC Clause 34 hereof.

5. Contractor's Responsibilities

5.1 The Contractor shall design, manufacture (including associated purchases and/or subcontracting), install and complete the Facilities with due care and diligence in accordance with the Contract.

5.2 The Contractor confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the Facilities (including any data as to boring tests) provided by the Employer, and on the basis of information that the Contractor could have obtained from a visual inspection of the Site (if access thereto was available) and of other data readily available to it relating to the Facilities as of the date twenty-eight (28) days prior to bid submission. The Contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Facilities.

5.3 The Contractor shall acquire in its name all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located that are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and

Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals and/or licenses that are not the responsibility of the Employer under GCC Sub-Clause 6.3 hereof and that are necessary for the performance of the Contract.

- 5.4 The Contractor shall comply with all laws in force in India. The laws will include all local, state, national or other laws that affect the performance of the Contract and bind upon the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Subcontractors and their personnel, but without prejudice to GCC Sub-Clause 6.1 hereof.
- 5.5 Any Plant, Material and Services that will be incorporated in or be required for the Facilities and other supplies shall have their origin as specified under GCC Sub-Clause 2.12 (Country of Origin).
- 5.6 The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor.

6. Employer's Responsibilities

- 6.1 The Employer shall ensure the accuracy of all information and/or data to be supplied by the Employer as described in the corresponding Appendix - 6 (Scope of Works and Supply by the Employer) to the Contract, except when otherwise expressly stated in the Contract.
- 6.2 The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way, as specified in the corresponding Appendix - 6 (Scope of Works and Supply by the Employer) to the Contract Agreement. The Employer shall give full possession of and accord all rights of access thereto on or before the date(s) specified in that Appendix.
- 6.3 The Employer shall acquire and pay for all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located which such authorities or undertakings require the Employer to obtain them in the Employer's name, are necessary for

the execution of the Contract (they include those required for the performance by both the Contractor and the Employer of their respective obligations under the Contract), including those specified in Appendix 6 (Scope of Works and Supply by the Employer) to the Contract Agreement.

- 6.4 If requested by the Contractor, the Employer shall use its best endeavors to assist the Contractor in obtaining in a timely and expeditious manner all permits, approvals and/or licenses necessary for the execution of the Contract from all local, state or national government authorities or public service undertakings that such authorities or undertakings require the Contractor or Subcontractors or the personnel of the Contractor or Subcontractors, as the case may be, to obtain.
- 6.5 Unless otherwise specified in the Contract or agreed upon by the Employer and the Contractor, the Employer shall provide sufficient, properly qualified operating and maintenance personnel; shall supply and make available all raw materials, utilities, lubricants, chemicals, catalysts, other materials and facilities; and shall perform all work and services of whatsoever nature, to enable the Contractor to properly carry out Commissioning, all in accordance with the provisions of Appendix 6 (Scope of Works and Supply by the Employer) to the Contract Agreement at or before the time specified in the program furnished by the Contractor under GCC Sub-Clause 14.2 (Program of Performance) hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.
- 6.6 The Employer shall be responsible for the continued operation of the Facilities after Taking Over, in accordance with GCC Sub-Clause 20.1.5.
- 6.7 All costs and expenses involved in the performance of the obligations under this GCC Clause 6 shall be the responsibility of the Employer.

C. Payment

7. Contract Price

- 7.1 The Contract Price shall be as specified in Article 2 (Contract Price and Terms of Payment) of the Form of Contract Agreement.
- 7.2 The Contract Price shall be subject to adjustment in accordance with the provisions of Appendix 2 (Price Adjustment) to the Contract Agreement. The Contract Price shall be increased or reduced on

account of variation in quantity in accordance with Clause 33 of GCC.

- 7.3 Subject to GCC Sub-Clauses 5.2 and 6.1 hereof, the Contractor shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract.

8. Terms of Payment

- 8.1 The Contract Price shall be paid as specified in the corresponding Appendix - 1 (Terms and Procedures of Payment) to the Contract Agreement. The procedures to be followed in making application for and processing payments shall be those outlined in the same Appendix.
- 8.2 All payments under the Contract shall be made in Indian Rupees.

9. Securities

9.1 Issuance of Securities

The Contractor shall provide the securities specified below in favor of the Employer at the times, and in the amount, manner and form specified below.

9.2 Advance Payment Security

- 9.2.1 The Contractor shall, within twenty-eight (28) days of the notification of contract award, provide a security in an amount equal to as follows:

- a. 110% (one hundred ten percent) of the amount of Advance for Supply of Goods; and
- b. 110% (one hundred ten percent) of the {amount of Advance} plus {amount of GST reimbursable on Advance as per the Proforma invoice} for Supply of Services.

The above shall be calculated in accordance with the corresponding Appendix - 1 (Terms and Procedures of Payment) to the Contract Agreement, and in the same currency(ies) with initial validity of up to ninety (90) days beyond the date of Completion of the Facilities in accordance with GCC Sub-Clause 20.1. The same shall be extended by the Contractor time to time till ninety (90) days beyond the actual

date of Completion of the Facilities, as may be required under the Contract.

- 9.2.2 The security shall be in the Form of unconditional Bank Guarantee attached hereto in Section VI - Sample Forms and Procedures. The security shall be discharged after completion of the facilities or relevant part thereof corresponding to which advance has been drawn.

- Procedure for effective reduction in the Advance Payment Security

The Advance Payment Security shall be allowed to be reduced every six (06) months after First Running Account Bill/Stage payment under the Contract if the validity of the Bank Guarantee is more than one year. The cumulative amount of reduction at any point of time shall not exceed seventy five percent (75%) of the advance corresponding to cumulative value of the Facilities completed as per a certificate to be issued by the Project Manager. It should be clearly understood that reduction in the value of advance Bank Guarantee shall not in any way dilute the Contractor's responsibility and liabilities under the Contract including in respect of the Facilities for which reduction in the value of security is allowed.

9.3 Performance Security

- 9.3.1 The Contractor shall, within twenty-eight (28) days of the notification of award, provide a performance security for the due performance of the Contract in the amount equivalent to Ten percent (10%) of the Contract Price, with a validity upto ninety (90) days beyond the Defect Liability Period. The same shall be extended by the Contractor time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract.

Apart from the Contractor's performance security, the Contractor shall be required to arrange additional performance securities, as specified in SCC, within twenty-eight (28) days of the notification of award in favour of the Employer in the form acceptable to the Employer.

- 9.3.1.1 Notwithstanding above, in case of the performance security (ies) for which the validity as per GCC Clause 9.3.1 is required to be more than 5 years, the Contractor may choose to submit the performance security with initial validity of 5 years. In such cases, the Contractor shall, however be required to extend the validity till ninety (90) days beyond the actual Defect Liability Period, as may be required under

the Contract at any time, but no later than 6 months, prior to expiry of the performance security failing which the said performance security shall be forfeited by the Employer.

9.3.1.2 If the Contractor delays submission of the performance security(ies) vis-à-vis the period specified in Clause GCC 9.3.1, then without prejudice to any other rights or remedies available with the Employer, following shall also be applicable:

- a) The Defect Liability Period pursuant to Clause GCC 22 for the Facilities or any relevant part thereof covered under the said performance security shall stand extended and the Contractor shall accordingly extend the validity of the Contract Performance Security to be furnished as per Clause GCC 9.3.1 by the period of delay as per Clause GCC 9.3.1.2 (c), over and above the period required as per the Contract.
- b) Alternatively, if the Contractor fails to extend the validity of the performance security pursuant to Clause GCC 9.3.1.1 (b), an amount @preailing SBI Card Rate applicable for Inland Bank Guarantee +2% per annum on the performance security amount corresponding to the Facilities or any relevant part thereof covered under the said performance security, for the period of delay as per Clause GCC 9.3.1.2 (c) shall be paid by the Contractor to the Employer. The Employer may, without prejudice to any other method of recovery, deduct the amount worked out as above from any monies due or to become due to the Contractor under the Contract.
- c) The period of delay for the above purpose shall be the time elapsed between the due date for submission of performance security as per the Contract and the date of performance security.
- d) In case the Contractor fails to submit the performance security within 90 days of the Notification of Award, the Employer, without prejudice to any other rights or remedies it may possess under the Contract, may forfeit the bid security and/or may terminate the Contract forthwith pursuant to GCC Clause 36.

9.3.1.3 The above extension of Defect Liability Period or deduction shall not relieve the Contractor from any of his obligations and liabilities under the Contract.

9.3.1.4 The Employer shall be sole judge in above regard.

- 9.3.1.5 Apart from the performance security(ies) to be furnished as per Clause GCC 9.3.1 above, additional performance securities, as specified in the Bidding Documents, shall be arranged and furnished by the Contractor at any time after the Notification of Award. The submission of these performance securities to the Employer shall, however, be one of the conditions precedent for release of payment (other than Initial/Mobilisation advance) due against such equipment/ works for which the said performance security is required to be submitted.
- 9.3.2 The performance security shall be in the Form of unconditional Bank Guarantee attached hereto in the Section VI - Sample Forms and Procedures.
- 9.3.3 Reduction in the security pro rata to the Contract Price of any part of the Facilities is not admissible. However, if the Defects Liability Period has been extended on any part of the Facilities pursuant to GCC Sub-Clause 22.8 hereof, the Contractor shall issue an additional security in an amount proportionate to the Contract Price of that part. The security shall be returned to the Contractor immediately after its expiration, provided, however, that if the Contractor pursuant to GCC Sub-Clause 22, is liable for an extended warranty obligation, the performance security shall be reduced to ten percent (10%) of the value of the component covered by the extended warranty.
- 9.3.4 In case of award of the contract to a Joint Venture, the Bank Guarantees for performance security and the Bank Guarantee for advance payment shall be submitted in the name of all the partner(s) of the Joint Venture

9.4 Issuing Banks

The Bank Guarantee for Advance Payment Security and Performance Security are to be provided by the Contractor, which should be issued either:

- (a) by a Public Sector Bank located in India, or
- (b) a scheduled Indian Bank having paid up capital (net of any accumulated losses) of Rs. 1,000 Million or above (the latest annual report of the Bank should support compliance of capital adequacy ratio requirement) *as per attached list only* **[List is placed at Annexure-I to Special Conditions of Contract (SCC)]**, or

- (c) by a foreign bank or a subsidiary of a foreign bank, acceptable to the Employer, with overall international corporate rating or rating of long term debt not less than A- (A minus) or equivalent by a reputed rating agency. Further, the Bank Guarantee should be confirmed by either (i) its corresponding bank located in India; or (ii) a Public Sector Bank located in India; or (iii) a scheduled commercial private bank located in India *as per the attached list only* [**List is placed at Annexure-I to Special Conditions of Contract (SCC)**].

9.5 Indemnity

9.5.1 For the equipment/material to be provided by the Contractor, it will be the responsibility of the Contractor to take delivery, unload and store the materials at Site and execute an Indemnity Bond and obtain authorisation letter from Employer as per proforma enclosed at Section VI (Sample Forms and Procedures), in favour of the Employer against loss, damage and any risks involved for the full value of the materials. This Indemnity Bond shall be furnished by the Contractor before commencement of the supplies and shall be valid till the scheduled date of Taking Over of the equipment by the Employer.

9.5.2 In case of divisible Contracts, where the Employer hands over his equipment to the Contractor for executing the Contract, then the Contractor shall, at the time of taking delivery of the equipment through Bill of Lading or other despatch documents, furnish trust Receipt for Plant, Equipment and Materials and also execute an Indemnity Bond in favour of the Employer in the form acceptable to the Employer for keeping the equipment in safe custody and to utilize the same exclusively for the purpose of the said Contract. Samples of proforma for the Trust receipt and Indemnity Bond are enclosed under Section VI (Sample Forms and Procedures). The Employer shall also issue a separate Authorization Letter to the Contractor to enable him to take physical delivery of plant, equipment and materials from the Employer as per proforma enclosed under Section VI (Sample Forms and Procedures).

10. Taxes and Duties

10.1 The Contractor shall be entirely responsible for payment of all taxes, duties, licence fees and other such levies legally payable/incurred until delivery of the contracted supplies to the Employer.

If it is statutory requirement to make deductions towards such taxes and duties or any other applicable taxes and duties, the same shall be

made by the Employer and a certificate for the same shall be issued to the Contractor.

10.2 The Contractor shall be solely responsible for the taxes that may be levied on the Contractor's persons or on earnings of any of his employees and shall hold the Employer indemnified and harmless against any claims that may be made against the Employer. The Employer does not take any responsibility whatsoever regarding taxes under Indian Income Tax Act, for the Contractor or his personnel. If it is obligatory under the provisions of the Indian Income Tax Act, deduction of Income Tax at source shall be made by the Employer.

10.3 In respect of supply of goods to the Employer by the Contractor, the EXW price is inclusive of all cost as well as duties and tax (viz., custom duties & levies, duties, GST etc.) paid or payable on components, raw materials and any other items used for their consumption incorporated or to be incorporated in the Plant & Equipment.

Further, the EXW price of (i) imported Equipments/items offered as 'Off the Shelf' or dispatched directly from the Indian Port of disembarkation are inclusive of all cost as well as any duties paid/payable in relation to import of such goods (viz., Customs duties, GST & levies etc.) and no separate claim on this behalf will be entertained by the Employer. If any tax exemptions, reductions, allowances or privileges may be available to the Contractor in the Country where the site is located and the Contractor has declared the same in its bid, the Employer shall use its best endeavors to enable the Contractor to benefit from such tax savings to the maximum allowable extent.

The Input Tax Credit (ITC) available, if any, under GST as per the relevant Government laws wherever applicable has been taken into account by the Contractor.

10.4 Ex-works price for the supply of goods viz. Equipment/items by the Contractor is excluding GST, if any, payable. The GST will be reimbursable (along with subsequent variation if any), by the Employer on the supplies made by the Contractor but limited to the tax liability on the transaction between the Employer and the Contractor.

Type test charges, if applicable, are excluding GST, if any, payable. Type test shall be considered an incidental expense incurred prior to the supply of goods viz. Equipment/items and would be added to

the value of goods viz. Equipment/items for GST purposes and GST for Type Test shall be reimbursed at the rate applicable for such Equipment/items.

Further the price for supply of services viz. Installation and training are excluding GST, if any, payable. The GST will be reimbursable (along with subsequent variation if any), by the Employer on the supplies made by the Contractor but limited to the tax liability on the transaction between the Employer and the Contractor.

It is the Employer's understanding that as per extant provisions, on the charges for supply of services related to Inland transportation, In-transit insurance, loading and unloading by the Contractor to the Employer, GST is not payable. The Contractor is, however, advised to check the position from their own sources. If payable, the same shall be to the Contractor's account and Employer shall not reimburse any GST on this account.

- 10.5 Employer would not bear any liability on account of any other taxes, duties, levies applicable locally.
- 10.6 Employer shall, deduct taxes at source as per the applicable laws/rules, if any, and issue Tax Deduction at Source (TDS) Certificate to the Contractor.
- 10.7 Reimbursement of GST by the Employer shall be at the rate applicable on the HSN/SAC of the goods/ services supplied by the Contractor to the Employer. The reimbursement of GST except GST on advance payment shall be against Invoice/Debit Note containing particulars specified under the GST Act and related Rules, Notifications, etc as notified by the Government in this regard. In the event that the Contractor fails to provide the invoice in the form and manner prescribed under the GST Act and Rules, the Employer shall not be liable to make any payment against such invoice. Reimbursement of GST payment against Advance payment (applicable for Supply of Services) shall be against a proforma invoice. Further, the Contractor shall, within 7 days from the date of receipt of Advance, furnish an Advance Receipt Voucher to the Employer, as prescribed under the GST Law.

If there is difference in HSN/SAC classification and corresponding rate of GST of an item as confirmed/deemed confirmed by the bidder in its bid and HSN/SAC and corresponding rate of GST as interpreted under any interpretation/ judgment/ Notification/ Circular/ amendment issued under the GST law before or after the award of contract, GST reimbursable to the bidder/Contractor shall

be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.

- 10.8 The Contractor shall comply with all tax laws in force in India. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, interest, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such tax laws by the Contractor or its personnel, including the Subcontractors and their personnel.
- 10.9 Owner's GSTIN number in each state/UT is published on the Owner's company website <https://www.powergridindia.com>. While raising invoice/proforma invoice for Supply of Goods, Contractor shall bill to and ship to the address of the Owner in the State/UT where the Goods or part thereof is to be Supplied and mention GSTIN of Owner in of the same state/UT. In case of Supply of Services, the Contractor shall invoice the Owner using the GSTIN of Owner in the state/UT in which the service or part thereof is to be rendered.
- 10.10 Notwithstanding anything above or elsewhere in the Contract, in the event that the input tax credit of the GST charged by the Contractor is denied by the tax authorities to the Employer for reasons associated with non-compliance/ incorrect compliance by the Contractor, the Employer shall be entitled to recover such amount from the Contractor by way of adjustment from any of the subsequent invoices submitted by the Contractor to the Employer. In addition to the amount of GST, the Employer shall also be entitled to recover interest and penalty, in case any interest and/or penalty are imposed by the tax authorities on the Employer for incorrect/wrong availment of Input Tax Credit. The Employer shall determine whether the denial of credit is linked to the non-compliance/ incorrect compliance of the Contractor and the said determination shall be binding on the Contractor.
- 10.11 For the purpose of the Contract, it is agreed that the Contract Price specified in Article 2(Contract Price and Terms of Payment) of the Contract Agreement is based on the taxes, duties, levies and charges prevailing at the date seven (07) days prior to the last date of bid submission (hereinafter called "Tax" in this GCC Sub-clause 10.7). If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation except for classification related purpose, or application of any Tax occurs in the course of the performance of the Contract, which was or will be assessed on the Contractor in connection with performance of the Contract, an equitable adjustment of the Contract price shall be made

to fully take into account any such change by addition to the Contract price or deduction therefrom, as the case may be, in accordance with GCC Clause 31 (Changes in Laws and Regulations) hereof. These adjustments shall be applicable for all transactions between the Employer and the Contractor for supply of goods and services under the Contract but shall not be applicable on procurement of raw materials, intermediary components etc. by the Contractor and on account of variation in taxes, duties & levies applicable locally.

In respect of raw materials, intermediary components etc and the taxes, duties & levies applicable locally, neither the Employer nor the Contractor shall be entitled to any claim arising due to increase or decrease in the rate of Tax, introduction of a new Tax or abolition of an existing Tax in the course of the performance of the Contract.

D. Intellectual Property

11. Copy Right

- 11.1 The copyright in all drawings, documents and other materials containing data and information furnished to the Employer by the Contractor herein shall remain vested in the Contractor or, if they are furnished to the Employer directly or through the Contractor by any third party, including supplies of materials, the copyright in such materials shall remain vested in such third party.

The Employer shall however be free to reproduce all drawings, documents and other material furnished to the Employer for the purpose of the Contract including, if required, for operation and maintenance.

- 11.2 The copyright in all drawings, documents and other materials containing data and information furnished to the Contractor by the Employer herein shall remain vested in the Employer.

12. Confidential Information

- 12.1 The Employer and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such

documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this GCC Clause 12.

- 12.2 The Employer shall not use such documents, data and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data and other information received from the Employer for any purpose other than the design, procurement of Plant and Equipment, construction or such other work and services as are required for the performance of the Contract.
- 12.3 The obligation of a party under GCC Sub-Clauses 12.1 and 12.2 above, however, shall not apply to that information which
- (a) now or hereafter enters the public domain through no fault of that party
 - (b) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party hereto
 - (c) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.
- 12.4 The above provisions of this GCC Clause 12 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Facilities or any part thereof.
- 12.5 The provisions of this GCC Clause 12 shall survive termination, for whatever reason, of the Contract.

E. Execution of the Facilities

13. Representatives

- 13.1 If the Project Manager is not named in the Contract, then within fourteen (14) days of the Effective Date, the Employer shall appoint and notify the Contractor in writing of the name of the Project Manager. The Employer may from time to time appoint some other person as the project Manager in place of the person previously so appointed, and shall give a notice of the name of such other person to the Contractor without delay. The Employer shall take all reasonable care to see that no such appointment is made at such a

time or in such a manner as to impede the progress of work on the Facilities. The Project Manager shall represent and act for the Employer at all times during the currency of the Contract. All notices, instructions, orders, certificates, approvals and all other communications under the Contract shall be given by the Project Manager, except as herein otherwise provided.

All notices, instructions, information and other communications given by the Contractor to the Employer under the Contract shall be given to the Project Manager, except as herein otherwise provided.

13.2 Contractor's Representative & Construction Manager

13.2.1 If the Contractor's Representative is not named in the Contract, then within fourteen (14) days of the Effective Date, the Contractor shall appoint the Contractor's Representative and shall request the Employer in writing to approve the person so appointed. If the Employer makes no objection to the appointment within fourteen (14) days, the Contractor's Representative shall be deemed to have been approved. If the Employer objects to the appointment within fourteen (14) days giving the reason therefor, then the Contractor shall appoint a replacement within fourteen (14) days of such objection, and the foregoing provisions of this GCC Sub-Clause 13.2.1 shall apply thereto.

13.2.2 The Contractor's Representative shall represent and act for the Contractor at all times during the currency of the Contract and shall give to the Project Manager all the Contractor's notices, instructions, information and all other communications under the Contract. All notices, instructions, information and all other communications given by the Employer or the Project Manager to the Contractor under the Contract shall be given to the Contractor's Representative or, in its absence, its deputy, except as herein otherwise provided. The Contractor shall not revoke the appointment of the Contractor's Representative without the Employer's prior written consent, which shall not be unreasonably withheld. If the Employer consents thereto, the Contractor shall appoint some other person as the Contractor's Representative, pursuant to the procedure set out in GCC Sub-Clause 13.2.1.

13.2.3 The Contractor's Representative may, subject to the approval of the Employer (which shall not be unreasonably withheld), at any time delegate to any person any of the powers, functions and authorities vested in him or her. Any such delegation may be revoked at any time. Any such delegation or revocation shall be subject to a prior notice signed by the Contractor's Representative, and shall specify

the powers, functions and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until a copy thereof has been delivered to the Employer and the Project Manager. Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with this GCC Sub-Clause 13.2.3 shall be deemed to be an act or exercise by the Contractor's Representative.

- 13.2.3.1 Notwithstanding anything stated in GCC Sub-Clause 13.1 and 13.2.1 above, for the purpose of execution of Contract, the Employer and the Contractor shall finalize and agree to a Contract Co-ordination Procedure and all the communication under the Contract shall be in accordance with such Contract Coordination Procedure.
- 13.2.4 From the commencement of installation of the Facilities at the Site until Operational Acceptance, the Contractor's Representative shall appoint a suitable person as the construction manager, (hereinafter referred to as "the Construction Manager"). The Construction Manager shall supervise all work done at the Site by the Contractor and shall be present at the Site through-out normal working hours except when on leave, sick or absent for reasons connected with the proper performance of the Contract. Whenever the Construction Manager is absent from the Site, a suitable person shall be appointed to act as his or her deputy.
- 13.2.5 The Employer may by notice to the Contractor object to any representative or person employed by the Contractor in the execution of the Contract who, in the reasonable opinion of the Employer, may behave inappropriately, may be incompetent or negligent, or may commit a serious breach of the Site regulations provided under GCC Sub-Clause 18.3. The Employer shall provide evidence of the same, whereupon the Contractor shall remove such person from the Facilities.
- 13.2.6 If any representative or person employed by the Contractor is removed in accordance with GCC Sub-Clause 13.2.5, the Contractor shall, where required, promptly appoint a replacement.

14. Work Program

14.1 Contractor's Organization

The Contractor shall supply to the Employer and the Project Manager a chart showing the proposed organization to be established by the Contractor for carrying out work on the Facilities. The chart shall include the identities of the key personnel together

with the curricula vitae of such key personnel to be employed within twenty-one (21) days of the Effective Date. The Contractor shall promptly inform the Employer and the Project Manager in writing of any revision or alteration of such an organization chart.

14.2 Program of Performance

Within twenty-eight (28) days after the date of Notification of Award, the Contractor shall prepare and submit to the Project Manager a detailed program of performance of the Contract (L2 Network) in the form of the Critical Path Method (CPM), the PERT network, or other internationally used programs and showing the sequence in which it proposes to design, manufacture, transport, assemble, install and pre-commissioning the Facilities, as well as the date by which the Contractor reasonably requires that the Employer shall have fulfilled its obligations under the Contract so as to enable the Contractor to execute the Contract in accordance with the program and to achieve Completion, Commissioning and Acceptance of the Facilities in accordance with the Contract. The program so submitted by the Contractor shall accord with the Time Schedule included in Appendix-4 (Time Schedule) to the Contract Agreement and any other dates and periods specified in the Contract. The Contractor shall update and revise the program as and when appropriate or when required by the Project Manager, but without modification in the Times for Completion under GCC Sub-Clause 4.2 and any extension granted in accordance with GCC Clause 34, and shall submit all such revisions to the Project Manager.

14.3 Progress Report

The Contractor shall monitor progress of all the activities specified in the program referred to in GCC Sub-Clause 14.2 above, and supply a progress report to the Project Manager every month.

The progress report shall be in a form acceptable to the Project Manager and shall indicate: (a) percentage completion achieved compared with the planned percentage completion for each activity; and (b) where any activity is behind the program, giving comments and likely consequences and stating the corrective action being taken.

14.4 Progress of Performance

If at any time the Contractor's actual progress falls behind the program referred to in GCC Sub-Clause 14.2, or it becomes apparent that it will so fall behind, the Contractor shall, at the request of the

Employer or the Project Manager, prepare and submit to the Project Manager a revised program, taking into account the prevailing circumstances, and shall notify the Project Manager of the steps being taken to expedite progress so as to attain Completion of the Facilities within the Time for Completion under GCC Sub-Clause 4.2, any extension thereof entitled under GCC Sub-Clause 34.1, or any extended period as may otherwise be agreed upon between the Employer and the Contractor.

14.5 Work Procedures

The Contract shall be executed in accordance with the Contract Documents and the procedures given in the section on Sample Forms and Procedures of the Contract Documents.

The Contractor may execute the Contract in accordance with its own standard project execution plans and procedures to the extent that they do not conflict with the provisions contained in the Contract.

15. Subcontracting

15.1 The corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement specifies major items of supply or services and a list of approved Subcontractors against each item, including vendors. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval in sufficient time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties or responsibilities under the Contract.

15.2 The Contractor shall select and employ its Subcontractors for such major items from those listed in the lists referred to in GCC Sub-Clause 15.1.

15.3 For items or parts of the Facilities not specified in the corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement for Supply Contract(s), the Contractor may employ such Subcontractors as it may select, at its discretion.

15.4 The Contractor shall furnish the details of items, components, raw materials, services etc. procured from MSEs and consumed for

completion of scope of works under the contract. The details shall be furnished as per the format enclosed at Section VI, Forms, Volume-I of the bidding documents at the time of raising bills for payment against the supplies made/works done.

16. Design and Engineering

16.1 Specifications and Drawings

- 16.1.1 The Contractor shall execute the basic and detailed design and the engineering work in compliance with the provisions of the Contract, or where not so specified, in accordance with good engineering practice.

The Contractor shall be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents that it has prepared, whether such specifications, drawings and other documents have been approved by the Project Manager or not, provided that such discrepancies, errors or omissions are not because of inaccurate information furnished in writing to the Contractor by or on behalf of the Employer.

- 16.1.2 The Contractor shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designated by or on behalf of the Employer, by giving a notice of such disclaimer to the Project Manager.

16.2 Codes and Standards

Wherever references are made in the Contract to codes and standards in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards current at the date twenty-eight (28) days prior to date of bid submission shall apply unless otherwise specified. During Contract execution, any changes in such codes and standards shall be applied after approval by the Employer and shall be treated in accordance with GCC Clause 33.

16.3 Approval/Review of Technical Documents by Project Manager

- 16.3.1 The Contractor shall prepare (or cause its Subcontractors to prepare) and furnish to the Project Manager the documents listed in Appendix-7 (List of Documents for Approval or Review) to the Contract Agreement for its approval or review as specified and as in

accordance with the requirements of GCC Sub-Clause 14.2 (Program of Performance).

Any part of the Facilities covered by or related to the documents to be approved by the Project Manager shall be executed only after the Project Manager's approval thereof.

GCC Sub-Clauses 16.3.2 through 16.3.7 shall apply to those documents requiring the Project Manager's approval, but not to those furnished to the Project Manager for its review only.

- 16.3.2 Within twenty one (21) days after receipt by the Project Manager of any document requiring the Project Manager's approval in accordance with GCC Sub-Clause 16.3.1, the Project Manager shall either return one copy thereof to the Contractor with its approval endorsed thereon or shall notify the Contractor in writing of its disapproval thereof and the reasons therefor and the modifications that the Project Manager proposes.
- 16.3.3 The Project Manager shall not disapprove any document, except on the grounds that the document does not comply with some specified provision of the Contract or that it is contrary to good engineering practice.
- 16.3.4 If the Project Manager disapproves the document, the Contractor shall modify the document and resubmit it for the Project Manager's approval in accordance with GCC Sub-Clause 16.3.2. If the Project Manager approves the document subject to modification(s), the Contractor shall make the required modification(s), and upon resubmission with the required modifications the document shall be deemed to have been approved.

The procedure for submission of the documents by the Contractor and their approval by the Project Manager shall be discussed and finalized with the Contractor.

- 16.3.5 If any dispute or difference occurs between the Employer and the Contractor in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) thereto that cannot be settled between the parties within a reasonable period, then such dispute or difference may be referred to an Arbitrator for determination in accordance with GCC Sub-Clause 39 hereof. If such dispute or difference is referred to an Arbitrator, the Project Manager shall give instructions as to whether and if so, how, performance of the Contract is to proceed. The Contractor shall proceed with the Contract in accordance with the Project Manager's

instructions, provided that if the Arbitrator upholds the Contractor's view on the dispute and if the Employer has not given notice under GCC Sub-Clause 39 hereof, then the Contractor shall be reimbursed by the Employer for any additional costs incurred by reason of such instructions and shall be relieved of such responsibility or liability in connection with the dispute and the execution of the instructions as the Arbitrator shall decide, and the Time for Completion shall be extended accordingly.

- 16.3.6 The Project Manager's approval, with or without modification of the document furnished by the Contractor, shall not relieve the Contractor of any responsibility or liability imposed upon it by any provisions of the Contract except to the extent that any subsequent failure results from modifications required by the Project Manager.
- 16.3.7 The Contractor shall not depart from any approved document unless the Contractor has first submitted to the Project Manager an amended document and obtained the Project Manager's approval thereof, pursuant to the provisions of this GCC Sub-Clause 16.3. If the Project Manager requests any change in any already approved document and/or in any document based thereon, the provisions of GCC Clause 33 shall apply to such request.

17. Plant and Equipment

- 17.1 Subject to GCC Sub-Clause 10.2, the Contractor shall manufacture or procure and transport all the Plant and Equipment in an expeditious and orderly manner to the Site.

17.2 Employer-Supplied Plant, Equipment, and Materials

If the corresponding Appendix - 6 (Scope of Works and Supply by the Employer) to the Contract Agreement provides that the Employer shall furnish any specific items of machinery, equipment or materials to the Contractor, the following provisions shall apply:

- 17.2.1 The Employer shall, at its own risk and expense, transport each item to the place on or near the Site as agreed upon by the parties and make such item available to the Contractor at the time specified in the program furnished by the Contractor, pursuant to GCC Sub-Clause 14.2, unless otherwise mutually agreed.
- 17.2.2 The equipment & materials to be furnished by the Employer shall be supplied to the Contractor at the depots established by the Contractor or the Employer. The Lorry Receipts for the materials will be handed over to the Contractor by the representative of the

Employer as and when the same are received. The Contractor shall be responsible for taking delivery of these materials from the railways/road transporter, unloading them from the transporter, carting them to different stores built by him for the purpose, the unloading and cartage being at the cost of the Contractor. All wharfage and demurrage charges incurred due to delay in taking delivery will be to the Contractor's account, except those due to reasons beyond his control in which case the Contractor shall immediately intimate the Engineer for settling the claims. The Contractor shall be responsible for proper handling and storage of these materials from the time of receipt upto the time of Taking Over of the Facilities by the Employer.

- 17.2.3 Yards and store provided by the Contractor for stacking and storage of materials shall be open for inspection by the Employer as and when required. The cost of handling and storage shall be to the Contractor's account.
- 17.2.4 Upon receipt of such item, the Contractor shall inspect the same visually and notify the Project Manager of any detected shortage, defect or default. For the material being arranged by the Employer and supplied to the Contractor for erection, are received short, broken or damaged, an entry shall be made in the delivery register of the railway authorities/road transporter as far as possible and a report of the same giving full details of shortage and damages along with a copy of report entered in the delivery register of the road transporter/railways shall be submitted by the Contractor to the Project Manager and Employer's consignee immediately. The Employer shall immediately remedy any shortage, defect or default, or the Contractor shall, if practicable and possible, at the request of the Employer, remedy such shortage, defect or default at the Employer's cost and expense. After inspection, such item shall fall under the care, custody and control of the Contractor. The provision of this GCC Sub-Clause 17.2.4 shall apply to any item supplied to remedy any such shortage or default or to substitute for any defective item, or shall apply to defective items that have been repaired.
- 17.2.5 The foregoing responsibilities of the Contractor and its obligations of care, custody and control shall not relieve the Employer of liability for any undetected shortage, defect or default, nor place the Contractor under any liability for any such shortage, defect or default whether under GCC Clause 22 or under any other provision of Contract.

17.3 Transportation

17.3.1 The Contractor shall at its own risk and expense transport all the Plant and Equipment and the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable under all the circumstances.

17.3.2 Unless otherwise provided in the Contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the Plant and Equipment and the Contractor's Equipment. In case of transportation by road, the Contractor shall transport all the goods only through registered common carriers in line with "The Carriage by Road Act, 2007" including amendment thereof.

17.3.3 Upon dispatch of each shipment of the Plant and Equipment and the Contractor's Equipment, the Contractor shall notify the Employer by telex, facsimile or Electronic Data Interchange (EDI) of the description of the Plant and Equipment and of the Contractor's Equipment, the point and means of dispatch, and the estimated time and point of arrival in the country where the Site is located, if applicable, and at the Site. The Contractor shall furnish the Employer with relevant shipping documents to be agreed upon between the parties.

17.3.4 The Contractor shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the Plant and Equipment and the Contractor's Equipment to the Site. The Employer shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested by the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the Plant and Equipment and the Contractor's Equipment to the Site.

17.4 Delivery and Documents

17.4.1 Delivery Documents

Upon shipment, the Contractor shall notify the Employer with full details of the dispatch and shall furnish the documents as specified in the corresponding Appendix - 1 (Terms and Procedures of Payment) to the Contract Agreement

17.4.2 Packing

- 17.4.2.1 The Contractor shall provide such packing of the Goods as it is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods final destination and the absence of heavy handling facilities at all points in transit.
- 17.4.2.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract and, subject to any subsequent instruction ordered by the Employer consistent with the requirements of the Contract.

18. Installation

18.1 Setting Out/Supervision/Labor

- 18.1.1 Bench Mark: The Contractor shall be responsible for the true and proper setting-out of the Facilities in relation to bench marks, reference marks and lines provided to it in writing by or on behalf of the Employer.

If, at any time during the progress of installation of the Facilities, any error shall appear in the position, level or alignment of the Facilities, the Contractor shall forthwith notify the Project Manager of such error and, at its own expense, immediately rectify such error to the reasonable satisfaction of the Project Manager. If such error is based on incorrect data provided in writing by or on behalf of the Employer, the expense of rectifying the same shall be borne by the Employer.

- 18.1.2 Contractor's Supervision: The Contractor shall give or provide all necessary superintendence during the installation of the Facilities, and the Construction Manager or its deputy shall be constantly on the Site to provide full-time superintendence of the installation. The Contractor shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

18.1.3 Labor:

- (a) The Contractor shall provide and employ on the Site in the installation of the Facilities such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged to use local labor preferably from weaker sections of society particularly SC & ST persons, that has the necessary skills.
- (b) Unless otherwise provided in the Contract, the Contractor at its own expense shall be responsible for the recruitment, transportation, accommodation and catering of all labor, local or expatriate, required for the execution of the Contract and for all payments in connection therewith.
- (c) The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst its employees and the labor of its Subcontractors.
- (d) The Contractor shall, in all dealings with its labor and the labor of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor.

18.2 Contractor's Equipment

- 18.2.1 All Contractor's Equipment brought by the Contractor onto the Site shall be deemed to be intended to be used exclusively for the execution of the Contract. The Contractor shall not remove the same from the Site without the Project Manager's consent that such Contractor's Equipment is no longer required for the execution of the Contract.
- 18.2.2 Unless otherwise specified in the Contract, upon completion of the Facilities, the Contractor shall remove from the Site all Equipment brought by the Contractor onto the Site and any surplus materials remaining thereon.
- 18.2.3 The Employer will, if requested, use its best endeavors to assist the Contractor in obtaining any local, state or national government permission required by the Contractor for the export of the Contractor's Equipment imported by the Contractor for use in the execution of the Contract that is no longer required for the execution of the Contract.

18.3 Site Regulations and Safety

The Employer and the Contractor shall establish Site regulations setting out the rules to be observed in the execution of the Contract at the Site and shall comply therewith. The Contractor shall prepare and submit to the Employer, with a copy to the Project Manager, proposed Site regulations for the Employer's approval, which approval shall not be unreasonably withheld.

Such Site regulations shall include, but shall not be limited to, rules in respect of security, safety of the Facilities, gate control, sanitation, medical care, and fire prevention.

18.3.1 Compliance with Labour Regulations

18.3.1.1 During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The employees of the Contractor and the Sub-contractor in no case shall be treated as the employees of the Employer at any point of time.

18.3.1.2 The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments.

18.3.1.3 If the Employer is caused to pay under any law as principal employer such amounts as may be necessary to cause or observe, or for non observance of the provisions stipulated in the notifications/ byelaws/ Acts/ Rules/ regulations including amendments, if any, on the part of the Contractor, the Employer shall have the right to deduct any money due to the Contractor under this contract or any other contract with the employer including his amount of performance security for adjusting the aforesaid payment. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

Notwithstanding the above, the Contractor shall furnish to the Employer the details/documents evidencing the Contractor's compliance to the laws applicable to establishments engaged in building and other construction works, as may be sought by the Employer. In particular the Contractor shall submit quarterly certificate regarding compliance in respect of provisions of Employees' Provident Fund and Misc. Provisions Act 1952 to the Employer. For this purpose, the Contractor as well as its Sub-Contractor(s) should have Provident Fund Code Number and all the workers deployed by the Contractor or Sub-Contractor must be enrolled as members of Provident Fund having an Universal Account Number (UAN).

18.3.1.4 Salient features of some major laws applicable to establishments engaged in building and other construction works:

- (a) Workmen Compensation Act 1923: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- (b) Payment of Gratuity Act 1972: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- (c) Employee P.F. and Miscellaneous Provision Act 1952: The Act provides for monthly contribution by the employer plus workers @10% or 8.33%. The benefits under the Act are:
 - (i) Pension or family pension on retirement or death, as the case may be.
 - (ii) Deposit linked insurance on death in harness of the worker.
 - (iii) Payment of P.F. accumulation on retirement/death etc.
- (d) Maternity Benefit Act 1951: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- (e) Contract Labour (Regulation & Abolition) Act 1970: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by law. The Principal Employer is required to take Certification of Registration and the Contractor is required to

take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more labour contract labour.

- (f) Minimum Wages Act 1948: The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provision of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.
- (g) Payment of Wages Act 1936: It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- (h) Equal Remuneration Act 1979: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- (i) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs. 3500/- per month or less. The bonus is to be paid to employees getting Rs. 2500/- per month or above upto Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.
- (j) Industrial Dispute Act 1947: the Act lays down the machinery the procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- (k) Industrial Employment (Standing Orders) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

- (l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- (m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.
- (n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service Act 1979: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.
- (o) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996 : All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the government.
- (p) Factories Act 1948: The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

18.3.2 Protection of Environment

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as consequence of his methods of operation.

During continuance of the Contract, the Contractor and his Sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

Salient features of some of the major laws that are applicable are given below:

The Water (Prevention and Control of Pollution) Act, 1974, This provides for the prevention and control of water pollution and the maintaining and restoring of wholesomeness of water. 'Pollution' means such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.

The Air (Prevention and Control of Pollution) Act, 1981, This provides for prevention, control and abatement of air pollution. 'Air Pollution' means the presence in the atmosphere of any 'air pollutant', which means any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment.

The Environment (Protection) Act, 1986, This provides for the protection and improvement of environment and for matters connected therewith, and the prevention of hazards to human beings, other living creatures, plants and property. 'Environment' includes water, air and land and the inter-relationship which exists

among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property.

The Public Liability Insurance Act, 1991, This provides for public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling hazardous substances and for matters connected herewith or incidental thereto. Hazardous substance means any substance or preparation which is defined as hazardous substance under Environment (Protection) Act, 1986, and exceeding such quantity as may be specified by notification by the Central Government.

- 18.3.2.1 (i) The Contractor shall (a) establish an operational system of managing environmental impacts, (b) carry out all the monitoring and mitigation measures set forth in the environment management plan attached to the Special Conditions of Contract as **Appendix-I**, and (c) allocate the budget required to ensure that such measures are carried out. The Contractor shall submit to the Employer (quarterly) semi-annual) reports on the carrying out of such measures.
- (ii) The Contractor shall adequately record the conditions of roads, agricultural land and other infrastructure prior to transport of material and construction commencement, and shall fully reinstate pathways, other local infrastructure and agricultural land to atleast their pre-project condition upon construction completion.
- (iii) The Contractor shall undertake detailed survey of the affected persons during transmission line alignment finalization under the Project, where applicable. and
- (iv) The Contractor shall conduct health and safety programme for workers employed under the Contract and shall include information on the risk of sexually transmitted diseases, including HIV/AIDS in such programs.

18.3.3 Safety Precautions

- 18.3.3.1 The Contractor shall observe all applicable regulations regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until Taking Over, provide:

- a) fencing, lighting, guarding and watching of the Works, and

- b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Employer / his representatives and occupiers of adjacent property, the public and others.

18.3.3.2 The Contractor shall ensure proper safety of all the workmen, materials, plant and equipment belonging to him or to Employer or to others, working at the Site. The Contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislations and the Project Manager, as he may deem necessary.

18.3.3.3 The Contractor will notify well in advance to the Project Manager of his intention to bring to the Site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals which may involve hazards. The Project Manager shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the Contractor shall strictly adhere to and comply with such instructions. The Project Manager shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. No claim due to such prohibition shall be entertained by the Employer and the Employer shall not entertain any claim of the Contractor towards additional safety provisions/conditions to be provided for/constructed as per the Project Manager's instructions.

Further, any such decision of the Project Manager shall not, in any way, absolve the Contractor of his responsibilities and in case, use of such a container or entry thereof into the Site area is forbidden by the Project Manager, the Contractor shall use alternative methods with the approval of the Project Manager without any cost implication to the Employer or extension of work schedule.

18.3.3.4 Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act, 1948 and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the Project Manager. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.

- 18.3.3.5 All equipment used in construction and erection by Contractor shall meet Indian/International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipment shall be strictly operated and maintained by the Contractor in accordance with manufacturer's Operation Manual and safety instructions and as per Guidelines/rules of Employer in this regard.
- 18.3.3.6 Periodical examinations and all tests for all lifting/hoisting equipment & tackles shall be carried-out in accordance with the relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated Laws/Rules in force from time to time. A register of such examinations and tests shall be properly maintained by the Contractor and will be promptly produced as and when desired by the Project Manager or by the person authorised by him.
- 18.3.3.7 The Contractor shall be fully responsible for the safe storage of his and his Sub-Contractor's radioactive sources in accordance with BARC/DAE Rules and other applicable provisions. All precautionary measures stipulated by BARC/DAE in connection with use, storage and handling of such material will be taken by the Contractor.
- 18.3.3.8 The Contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by the Project Manager who will also have right to examine these safety equipment to determine their suitability, reliability, acceptability and adaptability. The Contractor shall also provide Reflective Jackets to all workmen working on the site including different coloured such Jackets to the persons working at height.
- 18.3.3.9 Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practice/Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.
- 18.3.3.10 The Contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, good and standard quality of material only shall be used by the Contractor.

- 18.3.3.11 The Contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to the Employer or other Contractors under any circumstances, whatsoever, unless expressly permitted in writing by Employer to handle such fuses, wiring or electrical equipment
- 18.3.3.12 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Employer, he shall:
- a. Satisfy the Project Manager that the appliance is in good working condition;
 - b. Inform the Project Manager of the maximum current rating, voltage and phases of the appliances;
 - c. Obtain permission of the Project Manager detailing the sockets to which the appliances may be connected.
- 18.3.3.13 The Project Manager will not grant permission to connect until he is satisfied that;
- a. The appliance is in good condition and is fitted with suitable plug;
 - b. The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.
- 18.3.3.14 No electric cable in use by the Contractor/Employer will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.
- 18.3.3.15 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the Project Manager and a permit to work shall be issued by the Project Manager before any repair work is carried out by the Contractor. While working on electric lines/equipment, whether live or dead, suitable type and sufficient quantity of tools will have to be provided by the Contractor to electricians/workmen/officers.
- 18.3.3.16 The Contractors shall employ necessary number of qualified, full time electricians/electrical supervisors to maintain his temporary electrical installation.
- 18.3.3.17 The Contractor employing more than 250 workmen whether temporary, casual, probationer, regular or permanent or on contract,

shall employ at least one full time officer exclusively as safety officer to supervise safety aspects of the equipment and workmen, who will coordinate with the Project Safety Officer. In case of work being carried out through Sub-Contractors, the Sub-Contractor's workmen/employees will also be considered as the Contractor's employees/workmen for the above purpose.

The Contractor shall deploy one dedicated Safety Staff(s) for every 200 kms of a Transmission Line Project.

In case, the Contractor fails to deploy Qualified Safety Officer(s)/Safety Staff(s) under each Contract, as specified, then the Contractor shall be responsible for payment of a sum of Rs. 15,00,000/- per quarter till the Safety Officer(s)/Safety Staff(s) is deployed, to be deposited with the Employer, which will be retained in the Safety Corpus Fund pursuant to GCC Sub-Clause 18.3.3.26.

The name and address of such Safety Officers of the Contractor will be promptly informed in writing to Project Manager with a copy to Safety Officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of the Contract.

- 18.3.3.18 In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform but no later than 24 hrs. of the occurrence of the same, to the Project Manager in prescribed form and also to all the authorities envisaged under the applicable laws.

Notwithstanding above, in case of any fatal accident, the Board of Directors of Contractor shall review the incidence and a copy of Board's resolution signed by the Director/Company Secretary of the firm alongwith action plan for avoidance of such incidences in future shall be furnished promptly but no later than 60 days, to the Employer. Besides above, the CEO of the Contractor shall meet and apprise POWERGRID APEX SAFETY BOARD alongwith the Board's resolution of the cause of the fatal accident occurred and their future action plan/safety preparedness to prevent recurrence of such accidents in future within 60 days of the occurrence of the fatal accident.

- 18.3.3.19 The Project Manager shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the

persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Project Manager within 3 days of such stoppage of work and decision of the Project Manager in this respect shall be conclusive and binding on the Contractor.

18.3.3.20 The Contractor shall not be entitled for any damages/compensation for stoppage of work due to safety reasons as provided in GCC Sub-Clause 18.3.3.19 above and the period of such stoppage of work will not be taken as an extension of time for completion of work and will not be the ground for waiver of levy of liquidated damages.

18.3.3.21 It is mandatory for the Contractor to observe during the execution of the works, requirements of Safety Rules which would generally include but not limited to following:

Safety Rules

- a) Each employee shall be provided with initial indoctrination regarding safety by the Contractor, so as to enable him to conduct his work in a safe manner.
- b) No employee shall be given a new assignment of work unfamiliar to him without proper introduction as to the hazards incident thereto, both to himself and his fellow employees.
- c) Under no circumstances shall an employee hurry or take unnecessary chance when working under hazardous conditions.
- d) Employees must not leave naked fires unattended. Smoking shall not be permitted around fire prone areas and adequate fire fighting equipment shall be provided at crucial location.
- e) Employees under the influence of any intoxicating beverage, even to the slightest degree shall not be permitted to remain at work.
- f) There shall be a suitable arrangement at every work site for rendering prompt and sufficient first aid to the injured.
- g) The staircases and passageways shall be adequately lighted.

- h) The employees when working around moving machinery, must not be permitted to wear loose garments. Safety shoes are recommended when working in shops or places where materials or tools are likely to fall. Only experienced workers shall be permitted to go behind guard rails or to clean around energized or moving equipment.
- i) The employees must use the standard protection equipment intended for each job. Each piece of equipment shall be inspected before and after it is used.
- j) Requirements of ventilation in underwater working to licensed and experienced divers, use of gum boots for working in slushy or in inundated conditions are essential requirements to be fulfilled.
- k) In case of rock excavation, blasting shall invariably be done through licensed blasters and other precautions during blasting and storage/transport of charge material shall be observed strictly.

18.3.3.22 The Contractor shall follow and comply with all Employer Safety Rules, relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservations. In case of any discrepancy between statutory requirement and Employer Safety Rules referred above, the latter shall be binding on the Contractor unless the statutory provisions are more stringent.

18.3.3.23 If the Contractor fails in providing safe working environment as per Employer Safety Rules or continues the work even after being instructed to stop work by the Project Manager as provided in GCC Sub-Clause 18.3.3.19 above, the Contractor shall promptly pay to Employer, on demand by the Employer, compensation at the rate of Rs. 10,000/- per day or part thereof to be deposited in Safety Corpus Fund pursuant to GCC Sub-Clause 18.3.3.26, till the instructions are complied with and so certified by the Project Manager. However, in case of accident taking place causing injury to any individual, the provisions contained in GCC Sub-Clause 18.3.3.24 shall also apply in addition to compensation mentioned in this Clause.

18.3.3.24 If the Contractor does not take adequate safety precautions and/or fails to comply with the Safety Rules as prescribed by the Employer or under the applicable law for the safety of the equipment and plant or for the safety of personnel or the Contractor does not prevent

hazardous conditions which cause injury to his own employees or employees of other Contractors or Employer's employees or any other person who are at Site or adjacent thereto, then the Contractor shall be responsible for payment of a sum as indicated below to be deposited with the Employer, which will be passed on by the Employer to such person or next to kith and kin of the deceased:

a.	Fatal injury or accident causing death	Rs. 15,00,000/- per person
b.	Major injuries or accident causing 25% or more permanent disablement	Rs. 5,00,000/- per person

Permanent disablement shall have same meaning as indicated in Workmen's Compensation Act. The amount to be deposited with Employer and passed on to the person mentioned above shall be in addition to the compensation payable under the relevant provisions of the Workmen's Compensation Act and rules framed there under or any other applicable laws as applicable from time to time. In case the Contractor does not deposit the above mentioned amount with Employer, such amount shall be recovered by Employer from any monies due or becoming due to the Contractor under the contract or any other on-going contract.

Notwithstanding above, while executing the Contract(s), in case of any permanent disablement in hands/legs due to any accident(s), the Contractor shall arrange to provide modern electronic artificial Limb (Hands/Legs) to the victims of the accident either through any NGO or directly and also provide necessary training to the victims to use the same. The cost/expenditure, if any, shall be borne by the Contractor and the details of the same shall be provided to POWERGRID for information. The above shall be in addition to the compensation payable to the victim as applicable.

In case of any major accident, the Contractor shall withdraw its Representative (Project Manager) immediately and shall appoint its Representative (Project Manager) afresh pursuant to GCC Clause 13.2. The Contractor's Representative (Project Manager) removed hereinabove, thereafter shall not be permitted to work in any of projects/works of the Employer.

- 18.3.3.25 Notwithstanding above, the Contractor shall also be responsible for payment of sum as indicated below additionally which shall be deposited in Safety Corpus Fund pursuant to GCC Sub-Clause 18.3.3.26:

a.	Upon 1 st Fatal Accident due to negligence by the Contractor	Rs. 50,00,000/-
b.	Upon 2 nd Fatal Accident due to negligence by the Contractor	Rs. 75,00,000/-
c.	Upon 3 rd Fatal Accident due to negligence by the Contractor	Rs. 1,00,00,000/-
d.	Re-occurrence of Fatal Accident even after 3 rd Fatal Accident due to negligence by the Contractor	Rs. 1,00,00,000/- per fatal accident
e.	Tower Collapse leading to more than one (01) death attributable to the Contractor as per the Accident Enquiry Committee Report	Rs. 1,00,00,000/- per fatal accident in addition to a, b, c or d above, as applicable

18.3.3.26 The amount paid/ recovered from the Contractor on account of non-compliance to Safety measures shall be deposited in the 'Safety Corpus Fund', if not specified otherwise, established by the Employer. The 'Safety Corpus Fund' shall be used for augmentation of Safety measures in construction works, capacity building of workers, development of working conditions of workers like providing tents/ mobile toilets/ caravans, safety tools & plants etc. and undertaking such other activities which will facilitate in reducing the accidents. However, the Contractor shall have no claim in this regard and the Employer shall be sole judge in this regard.

18.3.3.27 If the Contractor observes all the Safety Rules and Codes, Statutory Laws and Rules during the currency of Contract awarded by the Employer and no accident occurs then Employer may consider the performance of the Contractor and award suitable 'ACCIDENT FREE SAFETY MERITORIOUS AWARD' as per scheme as may be announced separately from time to time.

18.3.3.28 The Contractor shall also submit 'Safety Plan' as per proforma specified in Section - Sample Forms and Procedures of the Bidding Documents alongwith all the requisite documents mentioned therein and as per check-list contained therein to the Engineer In-Charge for its approval within 60 days of award of Contract.

Further, one of the conditions for release of first progressive payment / subsequent payment towards Services Contract shall be submission of 'Safety Plan' alongwith all requisite documents and approval of the same by the Engineer In-Charge.

18.4 Opportunities for Other Contractors

- 18.4.1 The Contractor shall, upon written request from the Employer or the Project Manager, give all reasonable opportunities for carrying out the work to any other contractors employed by the Employer on or near the Site.
- 18.4.2 If the Contractor, upon written request from the Employer or the Project Manager, makes available to other contractors any roads or ways the maintenance for which the Contractor is responsible, permits the use by such other contractors of the Contractor's Equipment, or provides any other service of whatsoever nature for such other contractors, the Employer shall fully compensate the Contractor for any loss or damage caused or occasioned by such other contractors in respect of any such use or service, and shall pay to the Contractor reasonable remuneration for the use of such equipment or the provision of such services.
- 18.4.3 The Contractor shall also so arrange to perform its work as to minimize, to the extent possible, interference with the work of other contractors. The Project Manager shall determine the resolution of any difference or conflict that may arise between the Contractor and other contractors and the workers of the Employer in regard to their work.
- 18.4.4 The Contractor shall notify the Project Manager promptly of any defects in the other contractors' work that come to its notice, and that could affect the Contractor's work. The Project Manager shall determine the corrective measures, if any, required to rectify the situation after inspection of the Facilities. Decisions made by the Project Manager shall be binding on the Contractor.

18.5 Emergency Work

If, by reason of an emergency arising in connection with and during the execution of the Contract, any protective or remedial work is necessary as a matter of urgency to prevent damage to the Facilities, the Contractor shall immediately carry out such work.

If the Contractor is unable or unwilling to do such work immediately, the Employer may do or cause such work to be done as the Employer may determine is necessary in order to prevent damage to the Facilities. In such event the Employer shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefor. If the work done or caused to be done by the

Employer is work that the Contractor was liable to do at its own expense under the Contract, the reasonable costs incurred by the Employer in connection therewith shall be paid by the Contractor to the Employer. In case such work is not in the scope of the Contractor, the cost of such remedial work shall be borne by the Employer.

18.6 Site Clearance

18.6.1 Site Clearance in Course of Performance: In the course of carrying out the Contract, the Contractor shall keep the Site reasonably free from all unnecessary obstruction, store or remove any surplus materials, clear away any wreckage, rubbish or temporary works from the Site, and remove any Contractor's Equipment no longer required for execution of the Contract.

18.6.2 Clearance of Site after Completion: After Completion of all parts of the Facilities, the Contractor shall clear away and remove all wreckage, rubbish and debris of any kind from the Site, and shall leave the Site and Facilities clean and safe.

18.7 Watching and Lighting

The Contractor shall provide and maintain at its own expense all lighting, fencing, and watching when and where necessary for the proper execution and the protection of the Facilities, or for the safety of the owners and occupiers of adjacent property and for the safety of the public.

18.8 Work at Night and on Holidays

18.8.1 Unless otherwise provided in the Contract, no work shall be carried out during the night and on public holidays of the country where the Site is located without prior written consent of the Employer, except where work is necessary or required to ensure safety of the Facilities or for the protection of life, or to prevent loss or damage to property, when the Contractor shall immediately advise the Project Manager, provided that provisions of this GCC Sub-Clause 18.8.1 shall not apply to any work which is customarily carried out by rotary or double-shifts.

18.8.2 Notwithstanding GCC Sub-Clauses 18.8.1 or 18.1.3, if and when the Contractor considers it necessary to carry out work at night or on public holidays so as to meet the Time for Completion and requests the Employer's consent thereto, the Employer shall not unreasonably withhold such consent.

19. Test and Inspection

- 19.1 The Contractor shall at its own expense carry out at the place of manufacture and/or on the Site all such tests and/or inspections of the Plant and Equipment and any part of the Facilities as are specified in the Contract.
- 19.2 The Employer and the Project Manager or their designated representatives shall be entitled to attend the aforesaid test and/or inspection, provided that the Employer shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.
- 19.3 Whenever the Contractor is ready to carry out any such test and/or inspection, the Contractor shall give four weeks advance notice of such test and/or inspection and of the place and time thereof to the Project Manager. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Employer and the Project Manager (or their designated representatives) to attend the test and/or inspection.
- 19.4 The Contractor shall provide the Project Manager with a certified report of the results of any such test and/or inspection.
- If the Employer or Project Manager (or their designated representatives) fails to attend the test and/or inspection, or if it is agreed between the parties that such persons shall not do so, then the Contractor may proceed with the test and/or inspection in the absence of such persons, and may provide the Project Manager with a certified report of the results thereof.
- 19.5 The Project Manager may require the Contractor to carry out any test and/or inspection not required by the Contract, provided that the Contractor's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of work on the Facilities and/or the Contractor's performance of its other obligations under the Contract, due allowance will be made in respect of the Time for Completion and the other obligations so affected.
- 19.6 If any Plant and Equipment or any part of the Facilities fails to pass any test and/or inspection, the Contractor shall either rectify or replace such Plant and Equipment or part of the Facilities and shall repeat the test and/or inspection upon giving a notice under GCC Sub-Clause 19.3.

- 19.7 If any dispute or difference of opinion shall arise between the parties in connection with or arising out of the test and/or inspection of the Plant and Equipment or part of the Facilities that cannot be settled between the parties within a reasonable period of time, it may be referred to an Arbitrator for determination in accordance with GCC Sub-Clause 39.
- 19.8 The Contractor shall afford the Employer and the Project Manager, at the Employer's expense, access at any reasonable time to any place where the Plant and Equipment are being manufactured or the Facilities are being installed, in order to inspect the progress and the manner of manufacture or installation, provided that the Project Manager shall give the Contractor a reasonable prior notice.
- 19.9 The Contractor agrees that neither the execution of a test and/or inspection of Plant and Equipment or any part of the Facilities, nor the attendance by the Employer or the Project Manager, nor the issue of any test certificate pursuant to GCC Sub-Clause 19.4, shall release the Contractor from any other responsibilities under the Contract.
- 19.10 No part of the Facilities or foundations shall be covered up on the Site without the Contractor carrying out any test and/or inspection required under the Contract. The Contractor shall give a reasonable notice to the Project Manager whenever any such part of the Facilities or foundations are ready or about to be ready for test and/or inspection; such test and/or inspection and notice thereof shall be subject to the requirements of the Contract.
- 19.11 The Contractor shall uncover any part of the Facilities or foundations, or shall make openings in or through the same as the Project Manager may from time to time require at the Site, and shall reinstate and make good such part or parts.

If any parts of the Facilities or foundations have been covered up at the Site after compliance with the requirement of GCC Sub-Clause 19.10 and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating, and making good the same shall be borne by the Employer, and the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been delayed or impeded in the performance of any of its obligations under the Contract.

20. Completion of the Facilities and Operational Acceptance

20.1 Completion of the Facilities

20.1.1 Physical Completion

20.1.1.1 As soon as the Facilities or any part thereof has, in the opinion of the Contractor, been completed operationally and structurally and put in a tight and clean condition as specified in the Technical Specifications, excluding minor items not materially affecting the operation or safety of the Facilities, the Contractor shall so notify the Employer in writing.

20.1.2 Pre-Commissioning

20.1.2.1 Within seven (7) days after receipt of the notice from the Contractor under GCC Sub-Clause 20.1.1.1, the Project Manager shall deploy the operating and maintenance personnel and other material if so specified in the corresponding Appendix – 6 (Scope of Works and Supply by the Employer) to the Contract Agreement for Precommissioning of the Facilities or any part thereof.

20.1.2.2 As soon as reasonably practicable after the operating and maintenance personnel have been deployed by the Employer and other materials have been provided by the Employer in accordance with GCC Sub-Clause 20.1.2.1, the Contractor shall commence Precommissioning of the Facilities or the relevant part thereof, in presence of the Employer's representatives, as per procedures detailed in Technical Specifications in preparation for Commissioning.

20.1.2.3 As soon as all works in respect of Precommissioning are successfully completed and, in the opinion of the Contractor, the Facilities or any part thereof is ready for Commissioning, the Contractor shall notify the Project Manager in writing.

20.1.2.4 The Project Manager shall, within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 20.1.2.3, notify the Contractor in writing of any defects and/or deficiencies.

20.1.2.5 If the Project Manager notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies, and shall repeat the procedure described in GCC Sub-Clause 20.1.2.2. If in the opinion of the Contractor, the Facilities or any part thereof is now ready for Commissioning, the Contractor shall again notify the Project Manager in writing. If further defects and/or deficiencies are not notified by the Project Manager and if the

Project Manager is satisfied that the Precommissioning of Facilities or that part thereof have been successfully completed, the Project Manager shall, within seven (7) days after receipt of the Contractor's such notice, advise the Contractor to proceed with the Commissioning of the Facilities or part thereof.

- 20.1.2.6 If the Project Manager fails to inform the Contractor of any defects and/or deficiencies within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 20.1.2.4 or within seven (7) days after receipt of the Contractor's notice on completion of repeat procedure under GCC Sub-Clause 20.1.2.5, then the Precommissioning of the Facilities or that part thereof shall be considered to have been successfully completed as of the date of the Contractor's notice.
- 20.1.2.7 As soon as possible after Precommissioning, the Contractor shall complete all outstanding minor items so that the Facilities are fully in accordance with the requirements of the Contract, failing which the Employer will undertake such completion and deduct the costs thereof from any monies owing to the Contractor.
- 20.1.2.8 In the event that the Contractor is unable to proceed with the Precommissioning of the Facilities pursuant to Sub-Clause 20.1.2 for reasons attributable to the Employer either on account of non-availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Employer's control, the following provisions shall apply:

When the Contractor is notified by the Project Manager that he will be unable to proceed with the activities and obligations pursuant to above GCC Sub-Clause 20.1.2.8, the Contractor shall be entitled to the following:

- a) the Time of Completion shall be extended for the period of suspension without imposition of liquidated damages pursuant to GCC Sub-Clause 21.2.
- b) payments due to the Contractor in accordance with the provisions specified in Appendix I (Terms and Procedures of Payment) to the Contract Agreement, which would have not been payable in normal circumstances due to non-completion of the said activities and obligations, shall be released to the Contractor against submission of a security in the form of a bank guarantee of equivalent amount acceptable to the Employer, and which shall become null and void when the Contractor will have complied with its obligations regarding

these payments, subject to the provisions of GCC Sub-Clause 21.2.9 below.

- c) the expenses payable by the Contractor to the Bankers toward the extension of above security and extension of other securities under the Contract, of which validity need to be extended, shall be reimbursed to the Contractor by the Employer against documentary evidence.
- d) the additional charges toward the care of the Facilities pursuant to GCC Sub-Clause 28.1 shall be reimbursed to the Contractor by the Employer for the period between the notification mentioned above and the notification mentioned in GCC Sub-Clause 20.1.2.10 below. The provisions of GCC Sub-Clause 29.2 shall apply to the Facilities during the same period.

20.1.2.9 In the event that the period of suspension under GCC Sub-Clause 20.1.2.8 actually exceeds one hundred eighty (180) days, the Employer and the Contractor shall mutually agree to any additional compensation payable to the Contractor.

20.1.2.10 As and when, after the period of suspension under GCC Sub-Clause 20.1.2.8, the Contractor is notified by the Project Manager that the Facilities are ready for Precommissioning, the Contractor shall proceed without delay in performing all activities and obligations under the Contract.

20.1.3 Commissioning

20.1.3.1 Commissioning of the Facilities or any part thereof shall be commenced by the Contractor immediately after being advised by the Project Manager, pursuant to GCC Sub-Clause 20.1.2.5 or immediately after the Precommissioning is considered to be completed under GCC Sub-Clause 20.1.2.6.

20.1.3.1.1 Commissioning of the Facilities or any part thereof shall be completed by the Contractor as per procedures detailed in Technical Specifications.

20.1.3.2 The Employer shall, to the extend specified in Appendix - 6 (Scope of works and supply by the Employer), deploy the operating and maintenance personnel and supply all raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other materials required for commissioning.

- 20.1.3.3 In the event that the Contractor is unable to proceed with the Commissioning of the Facilities pursuant to Sub-Clause 20.1.3 for reasons attributable to the Employer either on account of non-availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Employer's control, the provisions of GCC Sub-Clause 20.1.2.8 to 20.1.2.9 shall apply.
- 20.1.3.4 As and when, after the period of suspension under GCC Sub-Clause 20.1.2.8, the Contractor is notified by the Project Manager that the Facilities are ready for Commissioning, the Contractor shall proceed without delay in performing all activities and obligations under the Contract.
- 20.1.4 Trial - Operation
- 20.1.4.1 Trial - Operation of the Facilities or any part thereof shall be commenced by the Contractor immediately after the Commissioning is completed pursuant to GCC Sub-Clause 20.1.3.1.1.
- 20.1.4.2 Trial - Operation of the Facilities or any part thereof shall be completed by the Contractor for the period specified in Technical Specification (or for a continuous period of 24 hours where such period is not specified in Technical Specification) and as per procedures detailed in Technical Specifications.
- 20.1.4.3 At any time after the events set out in GCC Sub-Clause 20.1.4.2 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Taking Over Certificate in the form provided in the Bidding Documents or in another form acceptable to the Employer in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.
- 20.1.4.4 The Project Manager shall within twenty-one (21) days after receipt of the Contractor's notice, issue an Taking Over Certificate.
- 20.1.5 Taking Over
- 20.1.5.1 Upon successful Trial - Operation of the Facilities or any part thereof, pursuant to GCC Sub-Clause 20.1.4, the Project Manager shall issue to the Contractor a Taking Over Certificate as a proof of the acceptance of the Facilities or any part thereof. Such certificate shall not relieve the Contractor of any of his obligations which otherwise survive, by the terms and conditions of Contract after issue of such certificate.

- 20.1.5.2 If within twenty one (21) days after receipt of the Contractor's notice, the Project Manager fails to issue the Taking Over Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Taking Over Certificate, the Facilities or the relevant part thereof shall be deemed to have been Taken Over as at the date of the Contractor's said notice.
- 20.1.5.3 Upon Taking Over of the Facilities or any part thereof, the Employer shall be responsible for the care and custody of the Facilities or the relevant part thereof, together with the risk of loss or damage thereto, and shall thereafter take over the Facilities or the relevant part thereof.
- 20.2 Operational Acceptance
- 20.2.1 Guarantee Test
- 20.2.1.1 The Guarantee Test (and repeats thereof), if any specified in the SCC and/or the Technical Specification, shall be conducted by the Contractor after successful Trial – Operation of the Facilities or the relevant part thereof to ascertain whether the Facilities or the relevant part can attain the Functional Guarantees specified in the Contract Documents or if otherwise required as per the Technical Specifications. The Contractor's and Project Manager's advisory personnel may witness the Guarantee Test. The Contractor shall promptly provide the Employer with such information as the Employer may reasonably require in relation to the conduct and results of the Guarantee Test (and any repeats thereof).
- 20.2.1.2 If for reasons not attributable to the Contractor, the Guarantee Test of the Facilities or the relevant part thereof cannot be successfully completed within the time stipulated in the Technical Specifications the period for completing the same shall be as agreed upon by the Employer and the Contractor.
- 20.2.2 Operational Acceptance
- 20.2.2.1 Operational Acceptance shall occur in respect of the Facilities or any part thereof as mentioned below:
- (I) In case no Functional Guarantees are applicable, Operational Acceptance shall occur when the Facilities or part thereof have been successfully Commissioned and Trial – Operation for the specified period have been successfully completed

(II) In case Functional Guarantees are applicable, Operational Acceptance shall occur when the Functional Guarantees are met or the Contractor has paid liquidated damages specified in GCC Sub-Clause 23.3 hereof; or

20.2.2.2 At any time after any of the events set out in GCC Sub-Clause 20.2.2.1 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Operational Acceptance Certificate in the form provided in the Bidding Documents or in another form acceptable to the Employer in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.

20.2.2.3 The Project Manager shall within twenty-one (21) days after receipt of the Contractor's notice, issue an Operational Acceptance Certificate.

20.2.2.4 Upon Operational Acceptance, pursuant to GCC Sub-Clause 20.2.2.2, the Project Manager shall issue to the Contractor a Operational Acceptance Certificate as a proof of the final acceptance of the Plant and Equipment. Such certificate shall not relieve the Contractor of any of his obligations which otherwise survive, by the terms and conditions of Contract after issue of such certificate.

20.2.2.5 If within twenty one (21) days after receipt of the Contractor's notice, the Project Manager fails to issue the Operational Acceptance Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Operational Acceptance Certificate, the Facilities or the relevant part thereof shall be deemed to have been accepted as at the date of the Contractor's said notice.

20.3 Partial Acceptance

20.3.1 If the Contract specifies that Commissioning shall be carried out in respect of parts of the Facilities, the provisions relating to Commissioning including the Trial - Operation and Guarantee Test shall apply to each such part of the Facilities individually, and the Operational Acceptance Certificate shall be issued accordingly for each such part of the Facilities.

F. Guarantees and Liabilities

21. Completion Time Guarantee

21.1 The Contractor guarantees that it shall attain Completion of the Facilities (or a part for which a separate time for completion is

specified in the SCC) within the Time for Completion specified in the SCC pursuant to GCC Sub-Clause 4.2, or within such extended time to which the Contractor shall be entitled under GCC Clause 34 hereof.

- 21.2 If the Contractor fails to comply with the Time for Completion in accordance with Clause GCC 21 for the whole of the facilities, (or a part for which a separate time for completion is agreed) then the Contractor shall pay to the Employer a sum equivalent to half percent (0.5%) of the Contract Price plus GST payable thereon for the whole of the facilities, (or a part for which a separate time for completion is agreed) as liquidated damages for such default and not as a penalty, without prejudice to the Employer's other remedies under the Contract, for each week or part thereof which shall elapse between the relevant Time for Completion and the date stated in Taking Over Certificate of the whole of the Works (or a part for which a separate time for completion is agreed) subject to the limit of five percent (5%) of Contract Price plus GST payable thereon for the whole of the facilities, (or a part for which a separate time for completion is agreed). The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.
- 21.3 No bonus will be given for earlier Completion of the Facilities or part thereof.

22. Defect Liability

- 22.1 The Contractor warrants that the Facilities or any part thereof shall be free from defects in the design, engineering, materials and workmanship of the Plant and Equipment supplied and of the work executed.
- 22.2 Unless otherwise specified in SCC, the Defect Liability Period shall be twelve (12) months from the date of Taking Over /Completion of Facilities (or any part thereof).

If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Plant and Equipment supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its

cost, repair, replace or otherwise make good (as the Contractor shall, at its discretion, determine) such defect as well as any damage to the Facilities caused by such defect. The Contractor shall not be responsible for the repair, replacement or making good of any defect or of any damage to the Facilities arising out of or resulting from any of the following causes:

- (a) improper operation or maintenance of the Facilities by the Employer
- (b) operation of the Facilities outside specifications provided in the Contract
- (c) normal wear and tear.

22.3 The Contractor's obligations under this GCC Clause 22 shall not apply to

- (a) any materials that are supplied by the Employer under GCC Sub-Clause 17.2, are normally consumed in operation, or have a normal life shorter than the Defect Liability Period stated herein
- (b) any designs, specifications or other data designed, supplied or specified by or on behalf of the Employer or any matters for which the Contractor has disclaimed responsibility herein
- (c) any other materials supplied or any other work executed by or on behalf of the Employer, except for the work executed by the Employer under GCC Sub-Clause 22.7.

22.4 The Employer shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect any such defect.

22.5 The Employer shall afford the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations under this GCC Clause 22. The Contractor may, with the consent of the Employer, remove from the Site any Plant and Equipment or any part of the Facilities that are defective if the nature of the defect, and/or any damage to the Facilities caused by the defect, is such that repairs cannot be expeditiously carried out at the Site.

22.6 If the repair, replacement or making good is of such a character that it may affect the efficiency of the Facilities or any part thereof, the Employer may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.

If such part fails the tests, the Contractor shall carry out further repair, replacement or making good (as the case may be) until that part of the Facilities passes such tests.

22.7 If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than fifteen (15) days), the Employer may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer in connection therewith shall be paid to the Employer by the Contractor or may be deducted by the Employer from any monies due the Contractor or claimed under the Performance Security.

22.8 If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Employer because of any of the aforesaid reasons.

Upon correction of the defects in the Facilities or any part thereof by repair/replacement, such repair/replacement shall have the Defect Liability Period extended by a period mentioned in GCC Sub-Clause 22.2 from the time of such replacement/repair of the facilities or any part thereof.

22.8.1 At the end of the Defect Liability Period, the Contractor's Liability ceases except for latent defects. The Contractor's liability for latent defects warranty shall be limited to period of ten (10) years from the end of Defect Liability Period. For the purpose of this clause, the latent defects shall be the defects inherently lying within the material or arising out of design deficiency, which do not manifest themselves during the Defect Liability Period defined in this GCC Clause 22, but later.

22.9 Except as provided in GCC Clauses 22 and 29, the Contractor shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the Facilities or

any part thereof, the Plant and Equipment, design or engineering or work executed that appear after Defect Liability Period except for the liability towards obligations that may survive in terms of the Contract after Defect Liability Period, except where such defects are the result of the gross negligence, fraud, criminal or willful action of the Contractor.

23. Functional Guarantees

- 23.1 The Contractor guarantees that the Facilities and all parts thereof shall attain the Functional Guarantees specified in the Technical Specifications, subject to and upon the conditions therein specified.
- 23.2 If, for reasons attributable to the Contractor, the minimum level of the Functional Guarantees specified in the Technical Specifications are not met either in whole or in part, the Contractor shall at its cost and expense make such changes, modifications and/or additions to the Plant or any part thereof as may be necessary to meet at least the minimum level of such Guarantees. The Contractor shall notify the Employer upon completion of the necessary changes, modifications and / or additions, and shall request the Employer to repeat the Guarantee Test until the minimum level of the Guarantees has been met. If the Contractor eventually fails to meet the minimum level of Functional Guarantees, the Employer may consider termination of the Contract pursuant to GCC Sub-Clause 36.2.2 and recover the payments already made to the Contractor.
- 23.3 If, for reasons attributable to the Contractor, the Functional Guarantees specified in the Technical Specifications are not attained either in whole or in part, but the minimum level of the Functional Guarantees specified in the Technical Specifications is met, the Contractor shall, at the Contractor's option, either
- (a) make such changes, modifications and/or additions to the Facilities or any part thereof that are necessary to attain the Functional Guarantees at its cost and expense within a mutually agreed time and shall request the Employer to repeat the Guarantee Test, or
 - (b) pay liquidated damages to the Employer in respect of the failure to meet the Functional Guarantees in accordance with the provisions in the SCC.
- 23.4 In case the Employer exercises its option to accept the equipment after levy of liquidated damages, the payment of liquidated damages under GCC Sub-Clause 23.3, upto the limitation of liability specified

in the SCC, shall completely satisfy the Contractor's guarantees under GCC Sub-Clause 23.3, and the Contractor shall have no further liability whatsoever to the Employer in respect thereof. Upon the payment of such liquidated damages by the Contractor, the Project Manager shall issue the Operational Acceptance Certificate for the Facilities or any part thereof in respect of which the liquidated damages have been so paid.

24. Equipment Performance Guarantees

- 24.1 The Contractor guarantees that the Equipments, named in the SCC, shall attain the rating and performance requirements specified in Appendix - 8 (Guarantees, Liquidated Damages for Non - Performance) to the Contract Agreement, subject to and upon the conditions therein specified.
- 24.2 If the guarantees specified in Appendix - 8 (Guarantees, Liquidated Damages for Non - Performance) to the Contract Agreement are not established, then the Employer shall, at the Employer's discretion either
- (a) reject the equipment, or
 - (b) accept the equipment after assessing liquidated damages in accordance with the provision in the SCC against the Contractor and such amounts shall be deducted from the Contract Price or otherwise recovered from the Contractor.
- 24.3 In case the Employer exercises its option to reject the equipment, the Contractor shall at its cost and expense make such changes, modifications and/or additions to the equipment or any part thereof as may be necessary to meet the specified guarantees. The Contractor shall notify the Employer upon completion of the necessary changes, modifications and/or additions, and shall request the Employer to repeat the Test until the level of the specified guarantee has been met.
- 24.4 Whenever the Employer exercises its option to accept the equipment after levy of liquidated damages, the payment of liquidated damages under GCC Sub-Clause 24.2, upto the limitation of liability specified in the SCC, shall completely satisfy the Contractor's guarantees under GCC Sub-Clause 24.2, and the Contractor shall have no further liability whatsoever to the Employer in respect thereof.

25. Patent Indemnity

- 25.1 The Contractor shall, subject to the Employer's compliance with GCC Sub-Clause 25.2, indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Employer may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract by reason of: (a) the installation of the Facilities by the Contractor or the use of the Facilities in the country where the Site is located; and (b) the sale of the products produced by the Facilities in any country.

Such indemnity shall not cover any use of the Facilities or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, any infringement resulting from the use of the Facilities or any part thereof, or any products produced thereby in association or combination with any other equipment, plant or materials not supplied by the Contractor, pursuant to the Contract Agreement.

- 25.2 If any proceedings are brought or any claim is made against the Employer arising out of the matters referred to in GCC Sub-Clause 25.1, the Employer shall promptly give the Contractor a notice thereof, and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the twenty-eight (28) day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

- 25.3 The Employer shall indemnify and hold harmless the Contractor and its employees, officers and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including

attorney's fees and expenses, which the Contractor may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Employer.

26. Limitation of Liability

26.1 Except in cases of gross negligence or willful misconduct,

- (a) the Contractor and the Employer shall not be liable to the other party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Employer and
- (b) the aggregate liability of the Contractor to the Employer, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Contractor to indemnify the Employer with respect to patent infringement.

G. Risk Distribution

27. Transfer of Ownership

- 27.1 Ownership of the Plant and Equipment (including spare parts) to be imported into India shall be transferred to the Employer upon loading on to the mode of transport to be used to convey the Plant and Equipment from the country of origin to that country and upon endorsement of the dispatch documents in favour of the Employer.
- 27.2 Ownership of the Plant and Equipment (including spare parts) procured in India, shall be transferred to the Employer upon loading on to the mode of transport to be used to carry the Plant and Equipment from the works/warehouse/ any other place where the Contractor wishes to supply the goods to the site and upon endorsement of the despatch documents in favour of the Employer.
- 27.3 Ownership of the Contractor's Equipment used by the Contractor and its Subcontractors in connection with the Contract shall remain with the Contractor or its Subcontractors.

- 27.4 Ownership of any Plant and Equipment in excess of the requirements for the Facilities shall revert to the Contractor upon Completion of the Facilities or at such earlier time when the Employer and the Contractor agree that the Plant and Equipment in question are no longer required for the Facilities provided quantity of any Plant and Equipment specifically stipulated in the Contract shall be the property of the Employer whether or not incorporated in the Facilities.
- 27.5 Notwithstanding the transfer of ownership of the Plant and Equipment, the responsibility for care and custody thereof together with the risk of loss or damage thereto shall remain with the Contractor pursuant to GCC Clause 28 (Care of Facilities) hereof until Completion of the Facilities and Taking Over pursuant to GCC Clause 20 or the part thereof, if any, as per GCC Sub-Clause 1.1(e) in which such Plant and Equipment are incorporated.

28. Care of Facilities

- 28.1 The Contractor shall be responsible for the care and custody of the Facilities or any part thereof until the date of Taking Over Certificate pursuant to GCC Clause 20 or, where the Contract provides for Completion of the Facilities in parts, until the date of Completion of the relevant part, and shall make good at its own cost any loss or damage that may occur to the Facilities or the relevant part thereof from any cause whatsoever during such period. The Contractor shall also be responsible for any loss or damage to the Facilities caused by the Contractor or its Subcontractors in the course of any work carried out, pursuant to GCC Clause 22. Notwithstanding the foregoing, the Contractor shall not be liable for any loss or damage to the Facilities or that part thereof caused by any use or occupation by the Employer or any third party (other than a Subcontractor) authorized by the Employer of any part of the Facilities.

29. Loss of or Damage to Property; Accident or Injury to Workers; Indemnification

- 29.1 The Contractor shall indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property (other than the Facilities whether accepted or not), arising in connection with the supply and installation of the Facilities and by reason of the negligence of the

Contractor or its Subcontractors, or their employees, officers or agents, except any injury, death or property damage caused by the negligence of the Employer, its contractors, employees, officers or agents.

- 29.2 If any proceedings are brought or any claim is made against the Employer that might subject the Contractor to liability under GCC Sub-Clause 29.1, the Employer shall promptly give the Contractor a notice thereof and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the twenty-eight (28) day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

- 29.3 Notwithstanding anything in this Contract to the contrary, it is agreed that neither the Contractor nor the Employer shall be liable to the other party for loss of production, loss of profit, loss of use or any other indirect or consequential damages.

30. Insurance

- 30.1 To the extent specified in the corresponding Appendix-3 (Insurance Requirements) to the Contract Agreement, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified in the said Appendix. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, who should not unreasonably withhold such approval.

(a) Marine Cargo Policy/Transit Insurance Policy:

(I)(i) Marine Cargo policy for imported equipment

The Contractor shall take the Marine Cargo Policy for Plant and Equipment including Mandatory Spares to be supplied from abroad wherein export/import including inland transit is involved for the movement of the Plant and Equipment including mandatory Spares. The policy shall cover movement of Plant and Equipment including mandatory Spares from the manufacturer's works to the project's warehouse at final destination site. The policy shall cover all risk for loss or damage that may occur during transit of Plant and Equipment including mandatory Spares from the Contractor/sub-Contractor's works or stores until arrival at project's warehouse/store at final destination. Institute Cargo Clause (ICC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) cover shall be taken.

(I)(ii) Transit Insurance Policy for indigenous equipment

Similarly, Transit Insurance Policy shall be taken wherein only inland transit is involved for the movement of Plant and Equipment including mandatory Spares supplied from within India. The policy shall cover movement of Plant and Equipment including mandatory Spares from the manufacturer's works to the project's warehouse at final destination site. Inland Transit Clause (ITC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) extension cover shall be taken.

(II) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(III) The Contractor shall take the policy in the joint names of Employer and the Contractor. The policy shall indicate the Employer as the beneficiary. However, if the Contractor is having an open policy for its line of business, it should obtain an endorsement of the open cover policy from the insurance company indicating that the dispatches against this Contract are duly covered under its open policy and include the name of the Employer as jointly Insured in the endorsements to the open policy.

(b) Erection All Risk Policy/Contractor All Risk Policy:

(I) The policy should cover all physical loss or damage to the facility at site during storage, erection and commissioning covering all the perils as provided in the policy as a basic cover and the add on covers as mentioned at Sl. No. (III) below.

(II) The Contractor shall take the policy in the joint name of Employer and the Contractor. All these policies shall indicate Employer as the beneficiary. The policy shall be kept valid till the date of the Operational Acceptance of the project and the period of the coverage shall be determined with the approval of the Employer.

If the work is completed earlier than the period of policy considered, the Contractor shall obtain the refund as per provisions of the policy and pass on the benefit to Employer. In case no refund is payable by the insurance company then the certificate to that effect shall be submitted to Employer at the completion of the project.

(III) The following add-on covers shall also be taken by the Contractor:

- i) Earthquake
- ii) Terrorism
- iii) Escalation cost (approximately @10% of sum insured on annual basis)
- iv) Extended Maintenance cover for Defect Liability Period
- v) Design Defect
- vi) Other add-on covers viz., 50-50 clause, 72 hours clause, loss minimization clause, waiver of subrogation clause (for projects of more than 100

crores, cover for offsite storage/fabrication (over 100 crores).

- (IV) Third Party Liability cover with cross Liability within Geographical limits of India as on ADD-on cover to the basic EAR cover:

The third party liability add-on cover shall cover bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities which have been accepted by the Employer) occurring in connection with supply and installation of the Facilities.

- (V) As per para 30.8 below, the cost of insurance premium is to be reimbursed to the Contractor for Owner Supplied Materials (OSM) for which the insurer is to be finalized by the Contractor as detailed therein. Alternatively, the Contractor may take a single policy covering the entire cost of the project including the cost of OSM. For this purpose, the Contractor shall submit documentary evidence for the premium paid for the entire project to the Employer and Employer shall reimburse to the Contractor the proportion of premium equal to value of OSM to total sum insured.

- (VI) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(c) Automobile Liability Insurance

The Contractor shall ensure that all the vehicles deployed by the Contractor or its Subcontractors (whether or not owned by them) in connection with the supply and installation of the Facilities in the project are duly insured as per RTA act. Further

the Contractor or its Subcontractors may also take comprehensive policy (own damage plus third party liability) of each individual vehicles deployed in the project on their own discretion in their own name to protect their own interest.

(d) Workmen Compensation Policy:

- (I) Workmen Compensation Policy shall be taken by the Contractor in accordance with the statutory requirement applicable in India. The Contractor shall ensure that all the workmen employed by the Contractor or its Subcontractors for the project are adequately covered under the policy.
- (II) The policy may either be project specific covering all men of the Contractor and its Subcontractors. The policy shall be kept valid till the date of Operational Acceptance of the project.

Alternatively, if the Contractor has an existing 'Workmen Compensation Policy' for all its employees including that of the Subcontractor(s), the Contractor must include the interest of the Employer for this specific Project in its existing 'Workmen Compensation Policy'.

- (III) Without relieving the Contractor of its obligations and responsibilities under this Contract, before commencing work the Contractor shall insure against liability for death of or injury to persons employed by the Contractor including liability by statute and at common law. The insurance cover shall be maintained until all work including remedial work is completed including the Defect Liability Period. The insurance shall be extended to indemnify the Principal for the Principal's statutory liability to persons employed by the Contractor.

The Contractor shall also ensure that each of its Subcontractors shall effect and maintain insurance on the same basis as the 'Workmen Compensation Policy' effected by the Contractor.

(e) Contractor's Plant and Machinery (CPM) Insurance

The Employer (including without limitation any consultant, servant, agent or employee of the Employer) shall not in any circumstances be liable to the Contractor for any loss of or

damage to any of the Contractor's Equipment or for any losses, liabilities, costs, claims, actions or demands which the Contractor may incur or which may be made against it as a result of or in connection with any such loss or damage.

- 30.2 The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1, except for the Third Party Liability, Workmen Compensation Policy Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1 except for the Cargo Insurance During Transport, Workmen Compensation Policy Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.
- 30.3 The Contractor shall, in accordance with the provisions of the corresponding Appendix - 3 (Insurance Requirements) to the Contract Agreement, deliver to the Employer certificates of insurance (or copies of the insurance policies) as evidence that the required policies are in full force and effect. The certificates shall provide that no less than twenty-one (21) days' notice shall be given to the Employer by insurers prior to cancellation or material modification of a policy.
- 30.4 The Contractor shall ensure that, where applicable, its Subcontractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Subcontractors are covered by the policies taken out by the Contractor.
- 30.5 The Employer shall at its expense take out and maintain in effect during the performance of the Contract those insurances specified in the corresponding Appendix - 3 (Insurance Requirements) to the Contract Agreement, in the sums and with the deductibles and other conditions specified in the said Appendix. The Contractor and the Contractor's Subcontractors shall be named as co-insureds under all such policies. All insurers' rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies. The Employer shall deliver to the Contractor satisfactory evidence that the required insurances are in full force and effect. The policies shall provide that not less than twenty-one (21) days' notice shall be given to the Contractor by all insurers prior to any cancellation or material modification of the policies. If so requested by the Contractor, the

Employer shall provide copies of the policies taken out by the Employer under this GCC Sub-Clause 30.5.

- 30.6 If the Contractor fails to take out and/or maintain in effect the insurances referred to in GCC Sub-Clause 30.1, the Employer may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Contractor under the Contract any premium that the Employer shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Contractor. If the Employer fails to take out and/or maintain in effect the insurances referred to in GCC 30.5, the Contractor may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Employer under the Contract any premium that the Contractor shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Employer.
- 30.7 Unless otherwise provided in the Contract, the Contractor shall prepare and conduct all and any claims made under the policies effected by it pursuant to this GCC Clause 30, and the monies payable by any insurers under all the insurance except Third Party Liability Insurance and Workmen Compensation Policy, shall be paid to the Special Account to be opened in the joint name of the Employer and the Contractor as mutually agreed and such amounts paid shall be apportioned between the Employer and the Contractor in accordance with the respective responsibilities under the Contract. The Employer shall give to the Contractor all such reasonable assistance as may be required by the Contractor. With respect to insurance claims in which the Employer's interest is involved, the Contractor shall not give any release or make any compromise with the insurer without the prior written consent of the Employer. With respect to insurance claims in which the Contractor's interest is involved, the Employer shall not give any release or make any compromise with the insurer without the prior written consent of the Contractor.
- 30.8 Further all equipment and materials being supplied by Employer for the erection (as per Technical Specification) shall be kept insured by the Contractor against any loss, damage, pilferage, theft, fire, etc. from the point of unloading up to the time of taking over by Employer including handling, transportation, storage, erection, testing and commissioning etc. The premium paid to the Insurance company by the Contractor for such insurance shall be reimbursed by Employer to the Contractor. The Contractor shall obtain competitive quotation for such insurance and shall take prior approval from Employer before taking the insurance. The insurable

value of the equipment being supplied by Employer shall be intimated to the Contractor for arranging the insurance.

- 30.9 It will be the responsibility of the Contractor to lodge, pursue and settle all claims with the insurance company in case of any damage, loss, theft, pilferage or fire during execution of Contract and Employer shall be kept informed about it. The Contractor shall replace the lost/damaged materials promptly irrespective of the settlement of the claims by the underwriters and ensure that the work progress is as per agreed schedules. The losses, if any, in such replacement will have to be borne by the Contractor.

31. Change in Laws and Regulations

- 31.1 If, after the date seven (07) days prior to the date of Bid Opening, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed in India (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. These adjustments shall be applicable for all transactions between the Employer and the Contractor for supply of goods and services under the Contract but shall not be applicable on procurement of raw materials, intermediary components etc. by the Contractor for which the Employer shall be the sole judge. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with the Appendix-2 to the Contract Agreement.

32. Force Majeure

- 32.1 “Force Majeure” shall mean any event beyond the reasonable control of the Employer or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:
- (a) war, hostilities or warlike operations (whether war be declared or not), invasion, act of foreign enemy and civil war,
 - (b) rebellion, revolution, insurrection, mutiny, usurpation of government, conspiracy, riot and civil commotion,

- (c) earthquake, landslide, volcanic activity, flood or cyclone, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster,
- 32.2 Neither party shall be considered to be in default or in breach of his obligations under the Contract to the extent that performance of such obligation is prevented by any circumstances of Force majeure, which arises after date of Notification of Award.
- 32.3 If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.
- 32.4 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with GCC Clause 34.

H. Change in Contract Elements

33. Change in the Facilities

- 33.1 Introducing a Change
 - 33.1.1 Subject to GCC Sub-Clauses 33.2.5 and 33.2.7, the Employer shall have the right to propose, and subsequently require, that the Project Manager order the Contractor from time to time during the performance of the Contract to make any change, modification, addition or deletion to, in or from the Facilities (hereinafter called "Change"), provided that such Change falls within the general scope of the Facilities and does not constitute unrelated work and that it is technically practicable, taking into account both the state of advancement of the Facilities and the technical compatibility of the Change envisaged with the nature of the Facilities as specified in the Contract.
 - 33.1.2 The Contractor may from time to time during its performance of the Contract propose to the Employer (with a copy to the Project Manager) any Change that the Contractor considers necessary or desirable to improve the quality, efficiency or safety of the Facilities. The Employer may at its discretion approve or reject any Change

proposed by the Contractor, provided that the Employer shall approve any Change proposed by the Contractor to ensure the safety of the Facilities.

33.1.3 Changes made necessary because of any default of the Contractor in the performance of its obligations under the Contract shall be not be deemed to be a Change, and such change shall not result in any adjustment of the Contract Price or the Time for Completion.

33.1.4 The procedure on how to proceed with and execute Changes is specified in GCC Sub-Clauses 33.2 and 33.3.

33.2 Changes Originating from Employer

33.2.1 The pricing of any Change shall, as far as practicable, be calculated in accordance with the rates and prices included in the Contract. If such rates and prices are inequitable, the parties thereto shall agree on specific rates for the valuation of the Change.

33.2.2 The Contract Price for (i) the items for which quantities have been indicated as lumpsum or lot or set and/or (ii) where the quantities are to be estimated by the Contractor shall remain constant unless there is change made in the Scope of Work by Employer. The quantities and unit prices (i) subsequently arrived while approving the Bill of Quantities (BOQ)/Billing breakup of lumpsum quantities/lot/Set and/or (ii) estimated by the Contractor shall be for on account payment purpose only. In case additional quantities, over and above the quantities in BOQ/billing breakup and /or estimated by the Contractor, are required for successful completion of the scope of work as per Technical Specification, the Contractor shall execute additional quantities of these items for which no additional payment shall be made over and above the lumpsum Contract Price. In case quantities of these items supplied at site are in excess of that required for successful completion of scope of work, such additional quantities shall be the property of the Contractor and they shall be allowed to take back the same from the site for which no deduction from the lumpsum Contract Price shall be made. Further, in case actual requirement of quantities for successful completion of scope of work is less than the quantities identified in the approved BOQ /billing breakup and/or estimated by the Contractor, the lumpsum contract price shall remain unchanged and no deduction shall be made from the lumpsum price due to such reduction of quantities.

It shall be the responsibility of the Contractor to pay all statutory taxes, duties and levies to the concerned authorities for such surplus

material which would otherwise have been, lawfully payable in case of non-deemed export contracts. The Contractor shall submit an indemnity bond to keep Employer harmless from any liability, before release of such material to the Contractor by Employer.

Set/Lot/Lumpsum shall be governed as per the requirement of the corresponding item description read in conjunction with relevant provisions of Technical Specifications and the Billing breakup referred to above shall be issued by the Employer based on Contractor's request, if and as may be required during the currency of the Contract.

HSN/SAC has not been indicated in the Contract for lumpsum quantities/lot/Set as each of these consists of many items for which billing break up shall be furnished during contract execution. GST shall be reimbursed on these items based on HSN /SAC for these items furnished along with billing breakup. However, the reimbursement shall be limited to the amount derived based on the rate indicated in the contract or actual, whichever is less.

- 33.2.3 If before or during the preparation of the Change Proposal it becomes apparent that the aggregate effect of compliance therewith and with all other Change Orders that have already become binding upon the Contractor under this GCC Clause 33 would be to increase or decrease the Contract Price as originally set forth in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement by more than the percentage specified in SCC, the Employer and the Contractor shall mutually agree on specific rates for valuation of the Change beyond the specified percentage.

For the said purpose, the Contract Price means the Contract Price of the Facilities notwithstanding the Construction of the Contract.

- 33.2.4 If rates and prices of any change are not available in the Contract, the parties thereto shall agree on specific rates for the valuation of the change and all matters therein related to the change. Based on the same, the Employer shall, if it intends to proceed with the Change, issue the Contractor with a Change Order.
- 33.2.5 The Employer shall issue the Contractor with a Change Order pursuant to GCC Sub-Clause 33.2 by way of amendment to the Contract or in any other manner deemed appropriate. Even if the Employer and the Contractor cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Completion, or any other matters related to the Change Proposal, the Employer may nevertheless instruct the Contractor to proceed with the Change

by issue of a "Pending Agreement Change Order" ("Pending Agreement Amendment").

Upon receipt of a Pending Agreement Change Order, the Contractor shall immediately proceed with effecting the Changes covered by such Order. The parties shall thereafter attempt to reach agreement on the outstanding issues under the Change Proposal.

If the parties cannot reach agreement within sixty (60) days from the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Arbitrator in accordance with the provisions of GCC Clause 38 & 39.

33.3 Changes Originating from Contractor

33.3.1 If the Contractor proposes a Change pursuant to GCC Sub-Clause 33.1.2, the Contractor shall submit to the Project Manager a written "Request for Change Proposal", giving reasons for the proposed Change and which shall include the following:

- (a) brief description of the Change
- (b) effect on the Time for Completion
- (c) estimated cost of the Change
- (d) effect on Functional Guarantees (if any)
- (e) effect on any other provisions of the Contract.

Upon receipt of the Request for Change Proposal, the parties shall follow the procedures outlined in GCC Sub-Clauses 33.2.1 and 33.2.5. However, should the Employer choose not to proceed, the Contractor shall not be entitled to recover the costs of preparing the Request for Change Proposal.

34. Extension of Time for Completion

34.1 The Time(s) for Completion specified in the SCC shall be extended if the Contractor is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

- (a) any Change in the Facilities as provided in GCC Clause 33
- (b) any occurrence of Force Majeure as provided in GCC Clause 32
- (c) any suspension order given by the Employer under GCC Clause 35 hereof or reduction in the rate of progress pursuant to GCC Sub-Clause 35.2 or

- (d) any changes in laws and regulations as provided in GCC Clause 31 or
- (e) any other matter specifically mentioned in the Contract

by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Contractor.

34.2 Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Project Manager a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Employer's estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to Arbitration, pursuant to GCC Sub-Clause 39.

34.3 The Contractor shall at all times use its reasonable efforts to minimize any delay in the performance of its obligations under the Contract.

35. Suspension

35.1 The Employer may request the Project Manager, by notice to the Contractor, to order the Contractor to suspend performance of any or all of its obligations under the Contract. Such notice shall specify the obligation of which performance is to be suspended, the effective date of the suspension and the reasons therefor. The Contractor shall thereupon suspend performance of such obligation (except those obligations necessary for the care or preservation of the Facilities) until ordered in writing to resume such performance by the Project Manager.

If, by virtue of a suspension order given by the Project Manager, other than by reason of the Contractor's default or breach of the Contract, the Contractor's performance of any of its obligations is suspended for an aggregate period of more than ninety (90) days, then at any time thereafter and provided that at that time such performance is still suspended, the Contractor may give a notice to the Project Manager requiring that the Employer shall, within twenty-eight (28) days of receipt of the notice, order the resumption of such performance or request and subsequently order a change in

accordance with GCC Clause 33, excluding the performance of the suspended obligations from the Contract.

If the Employer fails to do so within such period, the Contractor may, by a further notice to the Project Manager, elect to treat the suspension, where it affects a part only of the Facilities, as a deletion of such part in accordance with GCC Clause 33 or, where it affects the whole of the Facilities, as termination of the Contract under GCC Sub-Clause 36.1.

- 35.2 If the Contractor's performance of its obligations is suspended or the rate of progress is reduced pursuant to this GCC Clause 35, then the Time for Completion shall be extended in accordance with GCC Sub-Clause 34.1, and any and all additional costs or expenses incurred by the Contractor as a result of such suspension or reduction shall be paid by the Employer to the Contractor in addition to the Contract Price, except in the case of suspension order or reduction in the rate of progress by reason of the Contractor's default or breach of the Contract.
- 35.3 During the period of suspension, the Contractor shall not remove from the Site any Plant and Equipment, any part of the Facilities or any Contractor's Equipment, without the prior written consent of the Employer.

36. Termination

- 36.1 Termination for Employer's Convenience
- 36.1.1 The Employer may at any time terminate the Contract for any reason by giving the Contractor a notice of termination that refers to this GCC Sub-Clause 36.1.
- 36.1.2 Upon receipt of the notice of termination under GCC Sub-Clause 36.1.1, the Contractor shall either immediately or upon the date specified in the notice of termination
- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
 - (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) (ii) below
 - (c) remove all Contractor's Equipment from the Site, repatriate the Contractor's and its Subcontractors' personnel from the Site,

remove from the Site any wreckage, rubbish and debris of any kind, and leave the whole of the Site in a clean and safe condition

- (d) In addition, the Contractor, subject to the payment specified in GCC Sub-Clause 36.1.3, shall
 - (i) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
 - (ii) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant and Equipment as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors
 - (iii) deliver to the Employer all non-proprietary drawings, specifications and other documents prepared by the Contractor or its Subcontractors as at the date of termination in connection with the Facilities.

36.1.3 In the event of termination of the Contract under GCC Sub-Clause 36.1.1, the Employer shall pay to the Contractor the following amounts:

- (a) the Contract Price, properly attributable to the parts of the Facilities executed by the Contractor as of the date of termination
- (b) the costs reasonably incurred by the Contractor in the removal of the Contractor's Equipment from the Site and in the repatriation of the Contractor's and its Subcontractors' personnel
- (c) any amounts to be paid by the Contractor to its Subcontractors in connection with the termination of any subcontracts, including any cancellation charges
- (d) costs incurred by the Contractor in protecting the Facilities and leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 36.1.2
- (e) the cost of satisfying all other obligations, commitments and claims that the Contractor may in good faith have undertaken

with third parties in connection with the Contract and that are not covered by paragraphs (a) through (d) above.

36.2 Termination for Contractor's Default

36.2.1 The Employer, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefor to the Contractor, referring to this GCC Sub-Clause 36.2:

- (a) if the Contractor becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Contractor is a corporation, a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Contractor takes or suffers any other analogous action in consequence of debt
- (b) if the Contractor assigns or transfers the Contract or any right or interest therein in violation of the provision of GCC Clause 37.
- (c) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this Sub-Clause:

“Corrupt Practice” means offering, giving, receiving, or soliciting anything of value to influence the action of Employer official(s) in the procurement process.

“Fraudulent Practice” means any act including suppression/ misrepresentation of facts, submissions of forged/ false documents, making false declarations etc. that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial gain or benefit, or to avoid an obligation, or to influence procurement process to the detriment of interest of the Employer, including collusive practices among bidders (prior to or after bid submission) to establish bid prices at artificial, non-competitive levels and to deprive Employer of the benefits of competitive prices.

“collusive practice” shall also include an arrangement between two or more parties designed to achieve an illegitimate purpose to the detriment of interest of Employer.

“coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

“Obstructive practice” means

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/ or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation,

or

(bb) acts intended to materially impede the exercise of the contractual rights or audit or access to information.

In persuasions of its policy, the Employer will sanction a firm or individual, including declaring ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing, a contract.

36.2.2 If the Contractor

- (a) has abandoned or repudiated the Contract
- (b) has without valid reason failed to commence work on the Facilities promptly or has suspended (other than pursuant to GCC Sub-Clause 35.2) the progress of Contract performance for more than twenty-eight (28) days after receiving a written instruction from the Employer to proceed
- (c) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause

- (d) refuses or is unable to provide sufficient materials, services or labor to execute and complete the Facilities in the manner specified in the program furnished under GCC Sub-Clause 14.2 at rates of progress that give reasonable assurance to the Employer that the Contractor can attain Completion of the Facilities by the Time for Completion as extended,

then the Employer may, without prejudice to any other rights it may possess under the Contract, give a notice to the Contractor stating the nature of the default and requiring the Contractor to remedy the same. If the Contractor fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice, then the Employer may terminate the Contract forthwith by giving a notice of termination to the Contractor that refers to this GCC Sub-Clause 36.2.

36.2.3 Upon receipt of the notice of termination under GCC Sub-Clauses 36.2.1 or 36.2.2, the Contractor shall, either immediately or upon such date as is specified in the notice of termination,

- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) below
- (c) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
- (d) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant and Equipment as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors
- (e) deliver to the Employer all drawings, specifications and other documents prepared by the Contractor or its Subcontractors as of the date of termination in connection with the Facilities.

36.2.4 The Employer may enter upon the Site, expel the Contractor, and complete the Facilities itself or by employing any third party. The Employer may, to the exclusion of any right of the Contractor over the same, take over and use with the payment of a fair rental rate to the Contractor, with all the maintenance costs to the account of the

Employer and with an indemnification by the Employer for all liability including damage or injury to persons arising out of the Employer's use of such equipment, any Contractor's Equipment owned by the Contractor and on the Site in connection with the Facilities for such reasonable period as the Employer considers expedient for the supply and installation of the Facilities.

Upon completion of the Facilities or at such earlier date as the Employer thinks appropriate, the Employer shall give notice to the Contractor that such Contractor's Equipment will be returned to the Contractor at or near the Site and shall return such Contractor's Equipment to the Contractor in accordance with such notice. The Contractor shall thereafter without delay and at its cost remove or arrange removal of the same from the Site.

36.2.5 Subject to GCC Sub-Clause 36.2.6, the Contractor shall be entitled to be paid the Contract Price attributable to the Facilities executed as of the date of termination, the value of any unused or partially used Plant and Equipment on the Site, and the costs, if any, incurred in protecting the Facilities and in leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Sub-Clause 36.2.3. Any sums due to the Employer from the Contractor accruing prior to the date of termination shall be deducted from the amount to be paid to the Contractor under this Contract.

36.2.6 If the Employer completes the Facilities, the cost of completing the Facilities by the Employer shall be determined.

If the sum that the Contractor is entitled to be paid, pursuant to GCC Sub-Clause 36.2.5, plus the reasonable costs incurred by the Employer in completing the Facilities, exceeds the Contract Price or the entire Facilities if entire Facilities have been completed or the price for part of the Facilities if part of the Facilities have been completed, the Contractor shall be liable for such excess.

If such excess is greater than the sums due the Contractor under GCC Sub-Clause 36.2.5, the Contractor shall pay the balance to the Employer, and if such excess is less than the sums due the Contractor under GCC Sub-Clause 36.2.5, the Employer shall pay the balance to the Contractor. For facilitating such payment the Employer shall encash the Bank Guarantees of the Contractor available with the Employer and retain such other payments due to the Contractor under the Contract in question or any other Contract that the Employer may have with the Contractor.

The Employer and the Contractor shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

36.3 In this GCC Clause 36, the expression “Facilities executed” shall include all work executed, Installation Services provided, and all Plant and Equipment acquired (or subject to a legally binding obligation to purchase) by the Contractor and used or intended to be used for the purpose of the Facilities, up to and including the date of termination.

36.4 In this GCC Clause 36, in calculating any monies due from the Employer to the Contractor, account shall be taken of any sum previously paid by the Employer to the Contractor under the Contract, including any advance payment paid pursuant to the corresponding Appendix (Terms and Procedures of Payment) to the Contract Agreement.

37. Assignment

37.1 Neither the Employer nor the Contractor shall, without the express prior written consent of the other party (which consent shall not be unreasonably withheld), assign to any third party the Contract or any part thereof, or any right, benefit, obligation or interest therein or thereunder.

I. Resolution of Disputes

38. Settlement of Disputes

38.1 If any dispute of any kind whatsoever shall arise between the Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing, any question regarding its existence, validity or termination, or the execution of the Facilities, whether during the progress of the Facilities or after their completion and whether before or after the termination, abandonment or breach of the Contract, the parties shall seek to resolve any such dispute or difference, to the extent possible, amicably by mutual consultation.

38.2 If the parties fail to resolve such a dispute or difference by mutual consultation at the execution site level, then the dispute shall be referred by the Contractor to the Project Manager, who, within a period of thirty (30) days after being requested by Contractor to do so, shall give written notice of his decision.

- 38.2.1 The decision/instruction of the Project Manager shall be deemed to have been accepted by the Contractor unless notified by the Contractor of his intention to refer the matter for Arbitration within thirty (30) days of such decision/instruction.
- 38.2.2 In the event the Project Manager fails to notify his decision as aforesaid within thirty (30) days, the Contractor, if he intends to go for Arbitration, shall notify his intention to the Project Manager within 30 days of expiry of the first mentioned period of thirty days failing which it shall be deemed that there are no dispute or difference between the Employer and the Contractor.
- 38.3 In case of dispute or difference between the Employer and the Contractor, if the Employer intends to go for Arbitration, he shall notify such intention to the Contractor.

39. Arbitration

- 39.1 All disputes or differences in respect of which the decision, if any, of the Project Manager and/or the Head of the Implementing Authority has not become final or binding as aforesaid shall be settled by arbitration in the manner provided herein below:
- 39.2 The arbitration shall be conducted by a sole arbitrator in case the amount of claim is less than Rs. 25 Crore and by three member arbitral tribunal in case the amount of claim is greater than Rs. 25 Crore.

Sole Arbitration

The sole Arbitrator shall be chosen from a panel of empanelled Arbitrators maintained by POWERGRID. The same shall comprise of retired Judges and retired Senior executives of PSUs other than POWERGRID. Further, the choice of sole Arbitrator shall be governed by the amount of claim in the following manner:

Sl. no.	Claim amount	Work Experience/ Qualifications
1	< Rs. 10 Crore	Sole arbitrator-Retired Senior Executives of PSUs other than POWERGRID/Retired Distt Judges/ High Court Judges.
2	Rs.10 Crore- Rs.25 Crore	Sole arbitrator- Retired High Court/Supreme Court Judges

- (a) In case of invocation of arbitration by POWERGRID, POWERGRID shall, within 30 days, send a list of names of 3 arbitrators from its list/database of Arbitrators and the contractor shall within the period of further 30 days select any one person to act as "Sole Arbitrator", which will be confirmed by POWERGRID and matter will be referred to such appointed Arbitrator for further arbitration proceedings.
- (b) In case of invocation of arbitration by the Contractor, the Contractor shall request POWERGRID for its database of Arbitrators/ chose from the list of Arbitrators available on POWERGRID's website, and the contractor shall, within 30 days, select any one Arbitrator from the above to act as "Sole Arbitrator", which will be confirmed by POWERGRID within 30 days and matter will be referred to such appointed Arbitrator for further arbitration proceedings.

If the parties fail to appoint sole arbitrator within sixty (60) days after receipt of a notice from the other party invoking Arbitration, the appointment of sole arbitrator shall be done by Courts as per the provisions of Indian Arbitration and Conciliation Act, 1996 or any statutory modification thereof.

Three member arbitral tribunal

The arbitration shall be conducted by three arbitrators, who are retired High Court/Supreme Court Judges, one each to be nominated by the Contractor and the Employer and the third to be appointed by both the arbitrators in accordance with the Indian Arbitration & conciliation Act. If either of the parties fails to appoint its arbitrator within sixty (60) days after receipt of a notice from the other party invoking the Arbitration clause, the arbitrator appointed by the party invoking the arbitration clause shall become the sole arbitrator to conduct the arbitration. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus regarding appointment of presiding Arbitrator, within a period of 30 days from the appointment of the arbitrator appointed subsequently, the presiding arbitrator shall be appointed by Courts as per the provisions of Arbitration & conciliation Act.

- 39.3 The cost of arbitral proceedings inter-alia including the Arbitrators' fee, logistics and any other charges shall be equally shared by both parties.

In case of Sole Arbitrator, the fees to be paid to the sole Arbitrator shall be as per the terms of empanelment in POWERGRID whereas

in case of the three member tribunal, the Arbitrator's fees shall be as agreed upon by the Arbitrators in line with the Arbitration & Conciliation Act. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings shall be borne by each party itself

- 39.4 The language of the arbitration proceedings and that of the documents and communications between the parties shall be English. The arbitration shall be conducted in accordance with the provisions of the Indian Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The venue of arbitration shall be New Delhi.
- 39.5 The decision of the sole arbitrator/ the majority of the arbitrators, as the case may be, shall be final and binding upon the parties. In the event of any of the sole arbitrator/ any of the aforesaid arbitrators dying, neglecting, resigning or being unable to act for any reason, it will be lawful for the parties to nominate another sole arbitrator/ another arbitrator in place of the outgoing arbitrator.
- 39.6 During settlement of disputes and arbitration proceedings, both parties shall be obliged to carry out their respective obligations under the Contract.

----- End of Section-IV (GCC) -----

SECTION – V

SPECIAL CONDITIONS OF CONTRACT (SCC)

SPECIAL CONDITIONS OF CONTRACT (SCC)

The following bid specific data for the Plant and Equipment to be procured shall amend and/or supplement the provisions in the General Conditions of Contract (GCC)

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC							
1.	GCC 1.1(e) & 1.1(ee)	Supplementing Sub-Clause GCC 1.1(ee) The Time for Completion shall be as under : <table><tr><th>Description</th><th>Duration in Months from the date of Notification of Award</th></tr><tr><td>Taking Over by the Employer upon successful Completion of:</td><td></td></tr><tr><td>Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR). Spec. No.: CC/NTW-MISC/DOM/A06/23/11830</td><td>20 months (Twenty Months)</td></tr></table>		Description	Duration in Months from the date of Notification of Award	Taking Over by the Employer upon successful Completion of:		Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR). Spec. No.: CC/NTW-MISC/DOM/A06/23/11830	20 months (Twenty Months)
Description	Duration in Months from the date of Notification of Award								
Taking Over by the Employer upon successful Completion of:									
Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR). Spec. No.: CC/NTW-MISC/DOM/A06/23/11830	20 months (Twenty Months)								
2.	GCC 1.1(o)	Supplementing Sub-Clause GCC 1.1(o) The Employer is: Power Grid Corporation of India Limited, 'Saudamini', Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001. Kind Attn.: Sr. General Manager (CS) / Sr. DGM (CS-G7)/ Manager (CS-G7) (Thru Board) +91-124-282- 2397/3313/2353 Mobile: +91- 9910378008/ 9971399074/9599814162 Fax Nos.:- +91-124-2571 831 Email Address: edward@powergrid.in ; nrapendra@powergrid.in rmendhe@powergrid.in							
3.	GCC 1.1(w)	Supplementing Sub-Clause GCC 1.1(w) The Owner is: Power Grid Corporation of India Limited, 'Saudamini', Plot No.-2, Sector-29, Gurgaon (Haryana) - 122001. Kind Attn.: Sr. General Manager (CS) / Sr. DGM (CS-G7)/ Manager (CS-							

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		G7) (Thru Board) +91-124-282- 2397/3313/2353 Mobile: +91- 9910378008/ 9971399074/9599814162 Fax Nos.:- +91-124-2571 831 Email Address: edward@powergrid.in; nrapendra@powergrid.in rmendhe@powergrid.in
4.	GCC 2.1.1	Replace Sub-Clause GCC 2.1.1 with following: 2.1.1 The Contracts to be entered into with the successful Bidder shall be as under: (i) First Contract (<i>Supply of Goods</i>): For Ex-works supply of all equipments and materials including mandatory spares and Type Tests to be conducted (whether in India or abroad) (ii) Second Contract (<i>Supply of Services</i>): For providing all services i.e. inland transportation for delivery at site, In-transit insurance, unloading, handling at site, installation, Testing and commissioning including performance testing in respect of all the equipments supplied under the "First Contract", Training to be imparted (whether in India or abroad) and any other services specified in the Contract Documents. Annual Maintenance (AMC) for 1 year during Defect Liability Period and for 6 years after Defect Liability Period shall be part of Second Contract.
5.	GCC 4.1	Replace GCC 4.1 with the following: 4.1 Time for Completion is the essence of Contract. The Contractor shall commence work on the Facilities from the Effective Date of Contract and without prejudice to GCC Sub-Clause 21.2 hereof, the Contractor shall thereafter proceed with the Facilities in accordance with the time schedule specified in the corresponding Appendix – 4 (Time Schedule) to the Contract Agreement.
6.	GCC 5.7	Insert a new clause GCC 5.7 as follows: Vide Notification dated 8th May 2017 and its revision dated 29th May 2019 by Ministry of Steel has published "Policy for providing preference to Domestically Manufactured Iron & Steel Products in Government Procurement" (hereinafter DMI&SP policy). The Contractor shall comply with the guidelines specified in the policy including subsequent amendments/ modifications, if any. Further, in case of iron and steel products (whose HS codes are falling in Appendix-A of the DMI&SP policy as revised from time to time)

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		included in the BoQ/ scope of the package, the Contractor shall be required to provide the following requisite Certificate(s)/ Affidavit(s) in line with aforesaid policy: (i) Authorization Certificate issued by Domestic Manufacturer for selling Domestically Manufactured Iron & Steel Products (if applicable): In case the Iron & Steel Products as specified in the aforementioned Policy used for manufacturing / supply of Goods as under the package are sourced from domestic manufacturers other than the contractor, the contractor shall furnish Authorization certificate issued by domestic manufacturer for selling Domestically Manufactured Iron & Steel Products. Such certificate(s) shall be submitted by the contractor to the respective executing Region of POWERGRID, before supply of the said iron and steel products required under the contract, which shall be a condition precedent to release of associated progressive payment. (ii) Affidavit of Self certification regarding Domestic Value Addition in Iron & Steel Products: The contractor shall submit the Affidavit of self-certification, in original, to POWERGRID declaring that the Iron & Steel Products as specified in the aforementioned Policy used for manufacturing / supply of Goods under the package are domestically manufactured in terms of the domestic value addition prescribed in the policy, on a non-judicial stamp paper of Rs. 100/-. In case the Iron & Steel Products are sourced by the contractor, then the Affidavit of self-certification shall be issued by the contractor. Further, in case the Iron & Steel Products are to be sourced from Domestic manufacturer(s) other than the contractor, the Affidavit of self-certification shall be issued by the said Domestic Manufacturer(s). Such Affidavit(s) shall be submitted by the contractor to the respective executing Region of POWERGRID, before supply of the said iron and steel products required under the contract, which shall be a condition precedent to release of associated progressive payment. (iii) A value- addition certificate on half-yearly basis (Sep 30 and Mar 31), duly certified by the Statutory Auditors of the Domestic Manufacturer, that the claims of value-addition made for the

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		product during the preceding 6 months are in accordance with the Policy. Such certificate shall be filed within 60 days of commencement of each half year, to the respective executing Region of POWERGRID and shall continue to be filed till the completion of supply of the said products. Further, if the Domestic manufacturer from whom the Contractor had proposed to source the Iron & Steel products is changed during execution of the Contract, the Contractor shall furnish (i) authorization certificate, if applicable, (ii) affidavit of self-certification and (iii) value-addition certificate from the new Domestic manufacturer. In addition, DMI&SP policy shall also be applicable on inclusion of new/substituted items during post award stage which are covered under specified HS codes as per Appendix-A of the DMI&SP policy as revised from time to time. Violation to minimum prescribed domestic value addition or misrepresentation of facts by the bidder/contractor in this regard shall be dealt in line with provisions of the Integrity Pact.
7.	GCC 6.6	Replacing Sub-Clause GCC 6.6 The Employer shall be responsible for the continued operation of the Facilities after Taking Over, in accordance with GCC Sub-Clause 20.1.5. However, the bidder shall be responsible for Maintenance during Defect Liability Period and during AMC thereafter in accordance with provisions of Technical Specifications.
8.	GCC 9.2.2	Replacing Sub-Clause GCC 9.2.2 with following: The security shall be in the Form of unconditional Bank Guarantee attached hereto in Section VI - Sample Forms and Procedures. The security shall be discharged after completion of the facilities or relevant part thereof corresponding to which advance has been drawn. - Procedure for effective reduction in the Advance Payment Security The Advance Payment Security shall be allowed to be reduced every six (06) months after First Running Account Bill/Stage payment under the Contract if the validity of the Bank Guarantee is more than one year. The cumulative amount of reduction shall be allowed upto full value of the Bank Guarantee upon adjustment of the corresponding advance and certification to this effect by the Employer's representative. It should be clearly understood that reduction in the value of advance Bank Guarantee shall not in any way dilute the Contractor's responsibility and liabilities under the Contract including in

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		respect of the Facilities for which reduction in the value of security is allowed.
9.	GCC 9.3.1	Replace Sub-Clause GCC 9.3.1 with the following: The Contractor shall, within twenty-eight (28) days of the notification of award, provide a performance security for the due performance of the Contract in the amount equivalent to Ten percent (10%) of the Contract Price (including Maintenance charges for 1 year during Defect Liability Period and AMC charges for 6 years after Defect Liability Period), with a validity upto ninety (90) days beyond the Defect liability Period. The same shall be extended by the Contractor from time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract. The Contractor shall arrange additional Performance Security(ies), if applicable, as per Clause no. 4 of Joint Deed of Undertaking mentioned at Sl. No. 22 of Section – VI: Sample Forms and Procedures. The said security(ies) shall be required to be extended time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract. Apart from Performance Security(ies) as mentioned above, the contractor is required to arrange additional Performance Security(ies), for various equipment, if applicable, as per Technical Specifications. The above additional Performance Securities shall be submitted before release of first dispatch payment of respective equipment. The said security(ies) shall be required to be extended from time to time till ninety (90) days beyond the actual Defect Liability Period, as may be required under the Contract.
10.	GCC 9.3.1	Supplement Sub-clause GCC 9.3.1 with the following: Contractor shall within 28 days, after Defect Liability Period, provide Contract Performance Guarantee in the amount equivalent to Two Percent (2%) of the Total Contract Price to cover the contractor's obligations under Maintenance Period as per the provisions in the Technical Specification, Vol-II, with a validity upto ninety (90) days beyond the AMC Period, as per Form - 20 of Section – VI: Sample Forms and Procedures. The said security(ies) shall be required to be extended from time to time till ninety (90) days beyond completion period of Annual Maintenance Contract as may be required under the Contract.
11.	GCC 9.3.1.2 (b)	Replace the Clause reference GCC 9.3.1.1(b) appearing in second line with Clause GCC 9.3.1.2(a)
12.	GCC 9.3.1.2	Replace GCC 9.3.1.2 (d) with the following:

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	(d)	In case the Contractor fails to submit the performance security within 90 days of the Notification of Award, the Employer, without prejudice to any other rights or remedies it may possess under the Contract, may consider the bid submitted by the Contractor in future packages as non-responsive in line with ITB 13.6 and/or may terminate the Contract forthwith pursuant to GCC Clause 36.										
13.	GCC 9.3.2	Replace Sub-Clause GCC 9.3.2 The performance security shall, at the contractor’s option, be in the form of a crossed bank draft/pay order /banker certified cheque in favour of Employer/Owner# as stipulated in SCC in the Form of unconditional Bank Guarantee attached hereto in the Section VI - Sample Forms and Procedures. Alternatively, if performance security is to be submitted in favor of POWERGRID, the same can be submitted as online payment through POWERGRID ONLINE PAYMENT UTILITY- https://epay.powergrid.in, a link of which is provided on the POWERGRID website www.powergrid.in. While making online payment towards performance security, the bidder shall choose Segment as “Suppliers” and fill in details as follows: <table><tr><td>Payment Category</td><td>Performance Security</td></tr><tr><td>Sub-category</td><td>Performance Security Payment–CC</td></tr><tr><td>Name of Depositor</td><td>Name of the Contractor/Collaborator/Tower manufacturer/Licensor etc.</td></tr><tr><td>Vendor Code, if applicable</td><td>POWERGRID vendor code of the Contractor Collaborator/Tower manufacturer/Licensor etc., if existing</td></tr><tr><td>Payment Remarks</td><td>Performance Security for <i>[enter the name of the contract and last four digits of the CA number]</i></td></tr></table> The copy of ‘Online Payment Acknowledgement – Suppliers’ generated subsequent to the payment shall be submitted by the Contractor. The online payment facility shall be for payment in Indian Rupees only.	Payment Category	Performance Security	Sub-category	Performance Security Payment–CC	Name of Depositor	Name of the Contractor/Collaborator/Tower manufacturer/Licensor etc.	Vendor Code, if applicable	POWERGRID vendor code of the Contractor Collaborator/Tower manufacturer/Licensor etc., if existing	Payment Remarks	Performance Security for <i>[enter the name of the contract and last four digits of the CA number]</i>
Payment Category	Performance Security											
Sub-category	Performance Security Payment–CC											
Name of Depositor	Name of the Contractor/Collaborator/Tower manufacturer/Licensor etc.											
Vendor Code, if applicable	POWERGRID vendor code of the Contractor Collaborator/Tower manufacturer/Licensor etc., if existing											
Payment Remarks	Performance Security for <i>[enter the name of the contract and last four digits of the CA number]</i>											
14.	GCC 9.3.5	Add new sub Clause GCC 9.3.5 No interest shall be payable by the Employer on the performance Security.										
15.	GCC 9.3.6	Add new sub Clause GCC 9.3.6 During execution of contract the Contractor, after submission of Performance Security in form of a crossed bank draft/pay order /banker certified cheque/ online payment through POWERGRID ONLINE PAYMENT UTILITY, may opt to furnish the Performance Security in										

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		form of bank guarantee for the same amount and as per same terms of the Contract. On acceptance by the Employer of Performance Security submitted in the form of Bank Guarantee following receipt of confirmation from the issuing Bank, the said amount shall be refunded.									
16.	GCC 9.4	Supplementing GCC Clause 9.4 with the following The contractor has the option to submit BG (towards Advance Payment Security and Performance Security) using SFMS Platform. The Account details of POWERGRID for the purpose of Bank Guarantee (towards Advance Payment Security and Performance Security) to be issued using SFMS Platform are as given below: <table border="1"> <thead> <tr> <th>Name of the Bank and Address</th><th>IFSC Code</th><th>POWERGRID Current A/c No.</th></tr> </thead> <tbody> <tr> <td>State Bank of India, 4th & 5th Floor, Parsvnath Capital Tower, Bhai Veer Singh Marg, Gole Market, New Delhi - 110001</td><td>SBIN0017313</td><td>10813608670</td></tr> <tr> <td>ICICI Bank, Unit No. 01, Solitaire Plaza, DLF Phase III, M.G. Road, Gurugram</td><td>ICIC0002451</td><td>000705002702</td></tr> </tbody> </table> <i>Note: Any one of the above account details can be used for the issuance of Bank Guarantee using SFMS Platform.</i> In case of Bank Guarantee (towards Advance Payment Security and Performance Security) verification through SFMS facility of ICICI Bank, the applicant has to provide a unique identifier of POWERGRID to the issuing bank. This unique identifier needs to be incorporated by the issuing bank in Field 7037 of the IFIN 760 COV/ IFIN 767 COV while transmitting these messages to the Beneficiary Bank through SFMS. The unique identifier of POWERGRID is PGCIL50948846. In addition to the above, the Bank Guarantee (towards Advance Payment Security and Performance Security) should be submitted in the Physical form as specified in GCC Clause 9.	Name of the Bank and Address	IFSC Code	POWERGRID Current A/c No.	State Bank of India, 4 th & 5 th Floor, Parsvnath Capital Tower, Bhai Veer Singh Marg, Gole Market, New Delhi - 110001	SBIN0017313	10813608670	ICICI Bank, Unit No. 01, Solitaire Plaza, DLF Phase III, M.G. Road, Gurugram	ICIC0002451	000705002702
Name of the Bank and Address	IFSC Code	POWERGRID Current A/c No.									
State Bank of India, 4 th & 5 th Floor, Parsvnath Capital Tower, Bhai Veer Singh Marg, Gole Market, New Delhi - 110001	SBIN0017313	10813608670									
ICICI Bank, Unit No. 01, Solitaire Plaza, DLF Phase III, M.G. Road, Gurugram	ICIC0002451	000705002702									
17.	GCC 15.1	Replace GCC 15.1 with the following: The corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement specifies major items of supply or services and a list of approved Subcontractors against each item, including vendors. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval									

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		in sufficient time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties or responsibilities under the Contract. Further, the Contractor shall not subcontract any work to a subcontractor/sub vendor from such countries which shares a land border with India unless such subcontractor/sub vendor fulfills all requirement in regard to 'Bidder from a country which shares a land border with India' as per ITB clause 2.1. This restriction on subcontracting shall not be applicable for procurement of raw materials, components, sub-assemblies etc. However, in case of finished goods procured directly/indirectly from the vendors from the countries sharing land border with India, such vendor will be required to be registered with the Competent Authority.
18.	GCC 15.3	Replace the existing provision with the following: For items or parts of the Facilities not specified in the corresponding Appendix (List of Approved Subcontractors) to the Contract Agreement for Supply of Goods Contract(s), the Contractor may employ such Subcontractors as it may select, at its discretion.
19.	GCC 15.5	Adding New sub clause GCC 15.5 The Contractor shall sign the Integrity Pact with its Subcontractors before employing under the Contract.
20.	GCC 16.3.5	Replace GCC 16.3.5 with the following: If any dispute or difference occurs between the Employer and the Contractor in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) thereto that cannot be settled between the parties within a reasonable period, then such dispute or difference may be referred to an Arbitrator for determination /Conciliation Committee of Independent Experts (CCIE) for resolution in accordance with GCC Sub-Clause 39 / GCC Sub-Clause 40 hereof. If such dispute or difference is referred to an Arbitrator/CCIE, the Project Manager shall give instructions as to whether and if so, how, performance of the Contract is to proceed. The Contractor shall proceed with the Contract in accordance with the Project Manager's instructions, provided that if the Contractor's view on the dispute gets uphold as a result of the Arbitration/Conciliation proceedings, then the Contractor shall be reimbursed by the Employer for any additional costs incurred by reason of such instructions and shall be relieved of such responsibility or liability in connection with the dispute and the execution of the instructions as decided in Arbitration/CCIE proceedings, and the Time for Completion shall be

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		extended accordingly.
21.	GCC 18.1.3	Replace GCC 18.1.3 (a) with the following: The Contractor shall provide and employ on the Site in the installation of the Facilities such formally certified skilled labor as is necessary for the proper and timely execution of the Contract. Labor having “Recognition of Prior Learning” (RPL) Certification (under Pradhan Mantri Kaushal Vikas Yojana (PMKVY)) may be employed by the Contractor. Further, in case of deployment of semi-skilled and unskilled labor, the Contractor shall ensure that all such workers would be skilled through Recognition of Prior Learning (RPL) within two months from the date of commencement of work. All the costs to the above effect shall be borne by the Contractor. The Contractor is encouraged to use local labor preferably from weaker sections of society particularly SC & ST persons, that has the necessary skills.
22.	GCC 18.3.1.4 (a)	Replace the para 18.3.1.4 (a) with the following: Employee’s Compensation Act 1923: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
23.	GCC 18.3.3.17	Replace GCC 18.3.3.17 with the following: The Contractor shall deploy Safety Officer(s)/ Safety Supervisor(s)/ Safety Steward(s) in line with requirements as specified in the Safety Plan. The qualifications and experience, roles and responsibilities of the Safety Officer(s)/ Safety Supervisor(s)/ Safety Steward(s) shall be as prescribed in the Safety Plan. In case, the Contractor fails to deploy Qualified Safety Officer(s)/Safety Supervisor(s) /Safety Steward(s) under each Contract, as specified in the Safety Plan, then the Contractor shall be responsible for payment of a sum of Rs. 15,00,000/- per quarter or part thereof, on a pro-rata basis, till the Safety Officer(s)/ Safety Supervisor(s) /Safety Steward(s)) is deployed, to be deposited with the Employer, which will be retained in the Safety Corpus Fund pursuant to GCC Sub-Clause 18.3.3.26. Further, the Project Manager shall have the right at his sole discretion to stop the work in line with GCC Sub-Clause 18.3.3.19 till the Safety Officer(s)/ Safety Supervisor(s) /Safety Steward(s) is deployed by the Contractor. The name and address of such Safety Officers Safety Supervisor(s)

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		/Safety Steward(s) of the Contractor will be promptly informed in writing to Project Manager or his authorised representative with a copy to Safety Officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of the Contract.
24.	GCC 18.3.3.18	Replace GCC 18.3.3.18 with the following: In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform but no later than 4 hrs. of the occurrence of the same, to the Project Manager in prescribed form and also to all the authorities envisaged under the applicable laws. Notwithstanding above, in case of any fatal accident, the Board of Directors of Contractor shall review the incidence and a copy of Board's resolution signed by the Director/Company Secretary of the firm alongwith action plan for avoidance of such incidences in future shall be furnished promptly but no later than 60 days, to the Employer. Besides above, the CEO of the Contractor shall meet and apprise POWERGRID APEX SAFETY BOARD alongwith the Board's resolution of the cause of the fatal accident occurred and their future action plan/safety preparedness to prevent recurrence of such accidents in future within 60 days of the occurrence of the fatal accident. In case of failure of the Contractor to complete the above actions within 60 days, an extended period of 4 weeks is permitted to the Contractor to complete the same, along with a penalty of 0.05% of Contract Price as awarded, per week of delay or part thereof limited to Rs. 2.5 lakh per week, which shall be deposited in the Safety Corpus Fund. In case of failure of the Contractor to complete the above actions within the extended period of 4 weeks as above, the bids submitted by the Contractor shall be treated as non-responsive till completion of the same. In case of a fatal accident in a contract awarded to Joint Venture of 2 or more firms, partner(s) of the JV who was responsible for the execution of the said works as per their scope under the Contract, shall submit its Board Resolution and apprise the POWERGRID APEX SAFETY BOARD as brought out above. In case of a fatal accident in a contract awarded to and being executed by an Associate of Contractor, the Associate who is executing the erection/services contract corresponding to the scope of work in which accident has occurred, shall submit its Board Resolution and apprise the POWERGRID APEX SAFETY BOARD as brought out above.
25.	GCC 18.3.3.23	Replace GCC 18.3.3.23 with the following: If the Contractor fails in providing safe working environment as per Employer Safety Rules or continues the work even after being instructed to stop work by the Project Manager as provided in GCC Sub-Clause

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		18.3.3.19 above, the Contractor shall promptly pay to Employer, on demand by the Employer, a recovery at the rate of Rs. 10,000/- per day or part thereof to be deposited in Safety Corpus Fund pursuant to GCC Sub-Clause 18.3.3.26, till the instructions are complied with and so certified by the Project Manager. However, in case of accident taking place causing injury to any individual, the provisions contained in GCC Sub-Clause 18.3.3.24 shall also apply in addition to recovery mentioned in this Clause.						
26.	GCC 18.3.3.24	Replace GCC 18.3.3.24 with the following: In case of an accident at Site or adjacent thereto, the Contractor shall be responsible for payment of a sum as indicated below to be deposited with the Employer, which will be passed on by the Employer to such person or next to kith and kin of the deceased: <table border="1"> <tr> <td>a</td><td>Fatal injury or accident causing death</td><td>Rs. 15,00,000/- per person</td></tr> <tr> <td>b</td><td>Major injuries or accident causing 25% or more permanent disablement</td><td>Rs. 5,00,000/- per person</td></tr> </table> Permanent disablement shall have same meaning as indicated in Employee's Compensation Act. The amount to be deposited with Employer and passed on to the person mentioned above shall be in addition to the compensation payable under the relevant provisions of the Employee's Compensation Act and rules framed there under or any other applicable laws as applicable from time to time. In case the Contractor does not deposit the above mentioned amount with Employer, such amount shall be recovered by Employer from any monies due or becoming due to the Contractor under the contract or any other on-going contract. Notwithstanding above, while executing the Contract(s), in case of any permanent disablement in hands/legs due to any accident(s), the Contractor shall arrange to provide modern electronic artificial Limb (Hands/Legs) to the victims of the accident either through any NGO or directly and also provide necessary training to the victims to use the same. The cost/expenditure, if any, shall be borne by the Contractor and the details of the same shall be provided to POWERGRID for information. The above shall be in addition to the compensation payable to the victim as applicable. In case of first fatal accident, a warning letter shall be issued to the Contractor. In case of any subsequent fatal accident, the Contractor shall withdraw its Representative (Project Manager) immediately and shall appoint its Representative (Project Manager) afresh pursuant to GCC Clause 13.2. The Contractor's Representative (Project Manager) removed hereinabove, thereafter shall not be permitted to work in any of projects/works of the Employer.	a	Fatal injury or accident causing death	Rs. 15,00,000/- per person	b	Major injuries or accident causing 25% or more permanent disablement	Rs. 5,00,000/- per person
a	Fatal injury or accident causing death	Rs. 15,00,000/- per person						
b	Major injuries or accident causing 25% or more permanent disablement	Rs. 5,00,000/- per person						

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27.	GCC 18.3.3.25	Replace GCC 18.3.3.25 with the following: Notwithstanding above, the Contractor shall also be responsible for payment of sum as indicated below additionally which shall be deposited in Safety Corpus Fund pursuant to GCC Sub-Clause 18.3.3.26: <table border="1"> <tr> <td>a.</td><td>Upon 1st Fatal Accident</td><td>1% of the Contract price as awarded, limited to Rs. 50,00,000/-</td></tr> <tr> <td>b.</td><td>Upon 2nd Fatal Accident</td><td>1.5% of the Contract price as awarded, limited to Rs. 75,00,000/-</td></tr> <tr> <td>c.</td><td>Upon 3rd Fatal Accident</td><td>2% of the Contract price as awarded, limited to Rs. 1,00,00,000/-</td></tr> <tr> <td>d.</td><td>Re-occurrence of Fatal Accident even after 3rd Fatal Accident</td><td>2% of the Contract price as awarded, limited to Rs. 1,00,00,000/- per fatal accident</td></tr> </table> For the purpose of calculation of the aforesaid amounts, 'Contract price, as awarded', shall mean the total Contract Price for both Supply of Goods and Services for the works/facilities as per the originally awarded Contract/Notification/ Letter of Award (where contract has not been signed) exclusive of any taxes & duties additionally payable/reimbursable by POWERGRID or any change/adjustment due to Price Variation or subsequent amendments to the Contract or Notification/Letter of Award (where contract has not been signed). In case of a fatal accident in a contract awarded to Joint Venture of 2 or more firms, for the purpose of recoveries as per GCC Sub-Clause 18.3.3.24 and GCC Sub-Clause 18.3.3.25 above, the monies shall be recovered from the monies payable under the Contract to the JV in proportion to the price component of the scope of work of the respective partner. However, in case of shortfall in the recoveries of the due amount from any partner, the amount of such shortfall shall be recovered from the other partners(s) of JV. In case of a fatal accident in a contract awarded to and being executed by an Associate of Contractor, for the purpose of recoveries as per GCC Sub-Clause 18.3.3.24 and GCC Sub-Clause 18.3.3.25 above, the monies shall be recovered from the monies payable to the Contractor and the Associate under their respective contract(s) in proportion to the Contract Price of respective portion of scope, as awarded. However, if such monies to be recovered under any of the Contracts (say Services Contract), cannot be recovered from the concerned contractor (say Associate), it shall be suitably recovered from the other contracts (say CIF and Ex-works Supply contract). GST, if any, applicable on recoveries as mentioned at GCC Sub-Clause 18.3.3, shall be payable by the Contractor in addition to the amount of	a.	Upon 1st Fatal Accident	1% of the Contract price as awarded, limited to Rs. 50,00,000/-	b.	Upon 2nd Fatal Accident	1.5% of the Contract price as awarded, limited to Rs. 75,00,000/-	c.	Upon 3rd Fatal Accident	2% of the Contract price as awarded, limited to Rs. 1,00,00,000/-	d.	Re-occurrence of Fatal Accident even after 3rd Fatal Accident	2% of the Contract price as awarded, limited to Rs. 1,00,00,000/- per fatal accident
a.	Upon 1st Fatal Accident	1% of the Contract price as awarded, limited to Rs. 50,00,000/-												
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c.	Upon 3rd Fatal Accident	2% of the Contract price as awarded, limited to Rs. 1,00,00,000/-												
d.	Re-occurrence of Fatal Accident even after 3rd Fatal Accident	2% of the Contract price as awarded, limited to Rs. 1,00,00,000/- per fatal accident												

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		recoveries mentioned therein.
28.	GCC 18.3.3.28	Replace first Para of GCC 18.3.3.28 with the following: The Contractor shall also submit Safety Plan as per proforma specified in Section – Sample Forms and Procedures of the Bidding Documents alongwith all the requisite documents mentioned therein and as per check-list contained therein to the Engineer In-Charge for its approval within 30 days of Notification of award.
29.	GCC 18.3.3.29	Add new sub-clause: Non-reporting of any accident to the Employer in any ongoing contract with the Employer or any suppression of facts/related information in regard to accident shall lead to determination of bid of such Contractors as non-responsive for all packages whose date of bid opening, originally scheduled and/or actual falls within a period of one year reckoned from the date on which the Employer determines Non-reporting of the accident/Suppression of facts/related information in regard to accident by the Contractor.
30.	GCC 19.7	Replace GCC 19.7 with the following: If any dispute or difference of opinion shall arise between the parties in connection with or arising out of the test and/or inspection of the Plant and Equipment or part of the Facilities that cannot be settled between the parties within a reasonable period of time, it may be referred to an Arbitrator for determination /Conciliation Committee of Independent Experts (CCIE) for resolution in accordance with GCC Sub-Clause 39/GCC Sub-Clause 40.
31.	GCC 20.2.1	Deleted as Guarantee Tests are not applicable
32.	GCC 20.2.2.1 (II)	Deleted as Functional Guarantees are not applicable
33.	GCC 21.2	Replace GCC 21.2 with the following: If the Contractor fails to comply with the Time for Completion in accordance with Clause GCC 21 for the whole of the facilities, (or a part for which a separate time for completion is agreed) then the Contractor shall pay to the Employer a sum equivalent to 0.05% (zero point zero five percent) of the Contract Price plus GST payable thereon for the whole of the facilities, (or a part for which a separate time for completion is agreed) as liquidated damages for such default and not as a penalty, without prejudice to the Employer's other remedies under the Contract, for each day which shall elapse between the relevant Time for Completion and the date stated in Taking Over Certificate of the whole of the Works (or a part for which a separate time for completion is

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		agreed) subject to the limit of five percent (5%) of Contract Price plus GST payable thereon for the whole of the facilities, (or a part for which a separate time for completion is agreed). The parties agree that the sum specified above is not a penalty but a genuine pre-estimate of the loss/damage which will be suffered by the Employer for default on the part of the Contractor and said amount will be payable without proof of actual loss or damage caused by such default. The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.
34.	GCC 22.10	Addition of new Sub-Clause after GCC 22.9 GCC 22.10 Maintenance Period The bidder shall guarantee that the system offered shall meet the availability requirement as specified in the Section – 3 of Technical Specification commencing from the date of Taking Over/Completion of Facilities by the Employer/ Owner. In case the actual availability falls short of the above said guaranteed availability under the conditions specified in Section – 3 of Technical Specifications, Employer shall have rights and remedies specified in the said Clause.
35.	GCC 23	Deleted as Functional Guarantees are not applicable
36.	GCC 24.1	Supplementing Clause GCC 24.1 Bidder shall confirm the guaranteed performance or efficiency of the equipments in response to the Technical Specifications.
37.	GCC 30.1(a) (I) (ii)	Replace the existing Provision GCC 30.1(a) (I) (ii) as below: Transit Insurance Policy for indigenous equipment Similarly, Transit Insurance Policy shall be taken wherein only inland transit is involved for the movement of Plant and Equipment including mandatory Spares supplied from within India. The policy shall cover movement of Plant and Equipment including mandatory Spares from the manufacturer's works to the project's warehouse at final destination site. Inland Transit Clause (ITC) 'A' along with Strike Riots & Civil Commotion (SRCC) extension cover shall be taken.
38.	GCC 33.2.3	Supplementing Clause GCC 33.2.3

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		Percentage for the Change Proposal under this Clause shall be limited to Fifteen (15) percent.
39.	GCC 33.2.5	Replace the existing Provision GCC 33.2.5 as below: The Employer shall issue the Contractor with a Change Order pursuant to GCC Sub-Clause 33.2 by way of amendment to the Contract or in any other manner deemed appropriate. Even if the Employer and the Contractor cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Completion, or any other matters related to the Change Proposal, the Employer may nevertheless instruct the Contractor to proceed with the Change by issue of a “Pending Agreement Change Order” (“Pending Agreement Amendment”). Upon receipt of a Pending Agreement Change Order, the Contractor shall immediately proceed with effecting the Changes covered by such Order. The parties shall thereafter attempt to reach agreement on the outstanding issues under the Change Proposal. If the parties cannot reach agreement within sixty (60) days from the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Arbitrator/CCIE in accordance with the provisions of GCC Clause 38 & 39/40.
40.	GCC 34.2	Replace the existing Provision GCC 34.2 as below: Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Project Manager a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Employer’s estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to Arbitration/Conciliation, pursuant to GCC Sub-Clause 39/GCC Sub-Clause 40.
41.	GCC 38	Replace the existing Provision GCC 38 as below: 38. Settlement of Disputes 38.1 If any dispute of any kind whatsoever shall arise between the

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing, any question regarding its existence, validity or termination, or the execution of the Facilities, whether during the progress of the Facilities or after their completion and whether before or after the termination, abandonment or breach of the Contract, the parties shall seek to resolve any such dispute or difference, to the extent possible, amicably by mutual consultation. 38.2 If the parties fail to resolve such a dispute or difference by mutual consultation at the execution site level, then the dispute shall be referred by the Contractor to the Project Manager, who, within a period of thirty (30) days after being requested by Contractor to do so, shall give written notice of his decision. 38.2.1 The decision/instruction of the Project Manager shall be deemed to have been accepted by the Contractor unless notified by the Contractor of his intention to refer the matter for Arbitration/Conciliation within thirty (30) days of such decision/instruction. 38.2.2 In the event the Project Manager fails to notify his decision as aforesaid within thirty (30) days, the Contractor, if he intends to go for Arbitration/Conciliation, shall notify his intention to the Project Manager within 30 days of expiry of the first mentioned period of thirty days failing which it shall be deemed that there are no dispute or difference between the Employer and the Contractor. 38.3 In case of dispute or difference between the Employer and the Contractor, if the Employer intends to go for Arbitration/Conciliation, he shall notify such intention to the Contractor. 38.4 All disputes or differences in respect of which the decision, if any, of the Project Manager and/or the Head of the Implementing Authority has not become final or binding as aforesaid shall be settled by arbitration/conciliation in the manner provided herein below.
42.	GCC 39	Replace the existing Provision GCC 39 as below: 39. Arbitration

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC									
		39.1 The arbitration shall be conducted by a sole arbitrator in case the amount of claim is less than Rs. 25 Crore and by three member arbitral tribunal in case the amount of claim is greater than Rs. 25 Crore. <u>Sole Arbitration</u> The sole Arbitrator shall be chosen from a panel of empanelled Arbitrators maintained by POWERGRID. The same shall comprise of retired Judges and retired Senior executives of PSUs other than POWERGRID. Further, the choice of sole Arbitrator shall be governed by the amount of claim in the following manner: <table border="1"> <tr> <th>Sl no:</th><th>Claim amount</th><th>Work Experience/Qualifications</th></tr> <tr> <td>1</td><td>< Rs. 10 Crore</td><td>Sole arbitrator-Retired Senior Executives of PSUs other than POWERGRID/Retired Distt Judges/High Court Judges.</td></tr> <tr> <td>2</td><td>Rs.10 Crore-Rs.25 Crore</td><td>Sole arbitrator- Retired High Court/Supreme Court Judges</td></tr> </table> (a) In case of invocation of arbitration by POWERGRID, POWERGRID shall, within 30 days, send a list of names of 3 arbitrators from its list/database of Arbitrators and the contractor shall within the period of further 30 days select any one person to act as "Sole Arbitrator", which will be confirmed by POWERGRID and matter will be referred to such appointed Arbitrator for further arbitration proceedings. (b) In case of invocation of arbitration by the Contractor, the Contractor shall request POWERGRID for its database of Arbitrators/ chose from the list of Arbitrators available on POWERGRID's website, and the contractor shall, within 30 days, select any one Arbitrator from the above to act as "Sole Arbitrator", which will be confirmed by POWERGRID within 30 days and matter will be referred to such appointed Arbitrator for further arbitration proceedings. If the parties fail to appoint sole arbitrator within sixty (60) days after receipt of a notice from the other party invoking Arbitration, the appointment of sole arbitrator shall be done by Courts as per the provisions of Indian Arbitration and	Sl no:	Claim amount	Work Experience/Qualifications	1	< Rs. 10 Crore	Sole arbitrator-Retired Senior Executives of PSUs other than POWERGRID/Retired Distt Judges/High Court Judges.	2	Rs.10 Crore-Rs.25 Crore	Sole arbitrator- Retired High Court/Supreme Court Judges
Sl no:	Claim amount	Work Experience/Qualifications									
1	< Rs. 10 Crore	Sole arbitrator-Retired Senior Executives of PSUs other than POWERGRID/Retired Distt Judges/High Court Judges.									
2	Rs.10 Crore-Rs.25 Crore	Sole arbitrator- Retired High Court/Supreme Court Judges									

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		Conciliation Act, 1996 or any statutory modification thereof. <u>Three member arbitral tribunal</u> The arbitration shall be conducted by three arbitrators, who are retired High Court/Supreme Court Judges, one each to be nominated by the Contractor and the Employer and the third to be appointed by both the arbitrators in accordance with the Indian Arbitration & conciliation Act. If either of the parties fails to appoint its arbitrator within sixty (60) days after receipt of a notice from the other party invoking the Arbitration clause, the arbitrator appointed by the party invoking the arbitration clause shall become the sole arbitrator to conduct the arbitration. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus regarding appointment of presiding Arbitrator, within a period of 30 days from the appointment of the arbitrator appointed subsequently, the presiding arbitrator shall be appointed by Courts as per the provisions of Arbitration & conciliation Act. 39.2 The cost of arbitral proceedings inter-alia including the Arbitrators' fee, logistics and any other charges shall be equally shared by both parties. In case of Sole Arbitrator, the fees to be paid to the sole Arbitrator shall be as per the terms of empanelment in POWERGRID whereas in case of the three member tribunal, the Arbitrator's fees shall be as agreed upon by the Arbitrators in line with the Arbitration & Conciliation Act. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings shall be borne by each party itself. 39.3 The language of the arbitration proceedings and that of the documents and communications between the parties shall be English. The arbitration shall be conducted in accordance with the provisions of the Indian Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The venue of arbitration shall be New Delhi. 39.4 The decision of the sole arbitrator/ the majority of the arbitrators, as the case may be, shall be final and binding upon the parties. In the event of any of the sole arbitrator/ any of the aforesaid arbitrators dying, neglecting, resigning or being unable to act for any reason, it will be lawful for the parties to nominate

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		another sole arbitrator/ another arbitrator in place of the outgoing arbitrator. 39.5 Notwithstanding the above, in case the contractor is a Central Public Sector Enterprise (CPSE)/Government Organization or Department then the dispute/ difference (other than those related to taxation matters) between the Employer and the Contractor shall be settled through Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD) as mentioned in DPE OM No. 4(1)/2013-DPE(GM)/FTS-1835 dated 22.05.2018 and DPE OM No. DPE-GM-05/0003/2019-FTS-10937 dated 20.02.2020. The decision through AMRCD will be final and binding on all the concerned. 39.6 During settlement of disputes and arbitration proceedings, both parties shall be obliged to carry out their respective obligations under the Contract.
43.	GCC 40	<u>Addition of new Clause GCC 40 as per following:</u> 40. Conciliation 40.1 The mechanism of Dispute resolution through Conciliation shall be available in cases where the amount involved in the dispute exceeds INR 1 Cr. 40.2 The settlement of Disputes through conciliation mechanism shall be done by the Conciliation Committee of Independent Experts (CCIE) constituted by Ministry of Power, Govt. of India as per the procedure outlined in its OM dated 29.12.2021 as detailed herein below and its subsequent amendments/modifications (if any). 40.2.1 Each member of CCIE would be paid a sum of Rs. 50,000/- as sitting fee per sitting. In addition, Rs. 5,000/- per sitting will be paid for local transport charges for each day of proceeding. The conciliation proceedings shall be completed in each case through 5 sittings in a period of not more than three months from the date the reference made to the CCIE. In exceptional cases, if any dispute so merits, the time period may be extended at the discretion of Conciliation Committee (with reasons to be recorded in writing), for a further period of three months. In case, a particular dispute requires more than 5 sittings, the same may be held at the discretion of the CCIE but with a cap on payment of fee for 5 sittings only. The local transport charges

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		shall, however, be paid as provided for each day of sitting beyond the 5 sittings. 40.2.2 The CCIE shall hold day to day sitting at the Headquarter of the Employer or New Delhi and may hold as many sittings every month as it deems appropriate keeping in view the volume of work. 40.2.3 All expenditure incurred on the conciliation proceedings including payment of fees to the Conciliators, office space, logistic, secretarial assistance and other incidental expenses etc. shall be borne by the Employer initially. Thereafter it shall be shared equally by both parties on completion of the conciliation process. 40.3 The procedure of CCIE shall not be treated as alternate arbitration proceedings where both parties come with Statement of claims/defence, arguments/counter arguments, rejoinders, written submissions etc., aided by their respective lawyers. The forum of CCIE is a conciliation forum, where mutual give and take constitutes the essence, rather than strict legal positions of the parties. Hence, the parties are expected to be brief and to the point before the committee with regard to their respective stance and view the exercise in the spirit of conciliation / settlement. 40.4 The Standard Operating Procedure for the conciliation mechanism shall be as follows: i) On receipt of a reference from the Contractor for conciliation of dispute, the concerned Executive Director (Region) of the Employer shall send a communication within 7 working days thereby inviting the Contractor to depute a team of their representatives to interact with the Employer to crystallize the issues and prepare the agenda containing the gist on each dispute. ii) Once a conciliation request has been raised by the contractor, within 30 days the same shall be referred to the CCIE in the event of the matter remaining unresolved internally. iii) The Employer will also be free to suggest the option of resolution of disputes by conciliation in case a dispute has arisen. The contractor may select any one of the CCIEs as constituted by MOP after leaving out those CCIEs which are unavailable due to work load or any other reason as

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		maintained by Central Electricity Authority (CEA). iv) The Conciliation process shall be conducted under Part III of the Arbitration and Conciliation Act, 1996. v) The Conciliation Committee would either be able to resolve and settle the dispute(s) between the parties, or the process may fail. vi) In the event of the conciliation proceedings being successful, the parties to the dispute would sign the written settlement agreement and the conciliators would authenticate the same. Such settlement agreement would then be binding on the parties in terms of Section 73 of the Arbitration and Conciliation Act, 1996. vii) After successful conclusion of Conciliation, proceedings, the Parties to the conciliation process, have to undertake and complete all necessary actions for implementation of the terms of settlement within a period of 30 days from execution of settlement agreement, unless a different timeline not exceeding 60 days is agreed upon in settlement agreement. All pending claims of parties, in connection with the dispute, before any other legal forum are to be withdrawn within the said 30 days in pursuance of the settlement agreement. viii) In case of failure of the conciliation process at the level of the Conciliation Committee, the parties may withdraw from conciliation process and take recourse to the laid down legal process of Courts. However, the option of Arbitration would not be available once the conciliation mechanism has been exercised. 40.5 In cases of disputes pending before the Arbitration Tribunals or the Courts, both of the parties (i.e. Employer and Contractor) need to agree to explore the possibilities of conciliation through the Conciliation Committee of Independent Experts. In case of such agreement, an appropriate reference shall be made to the Conciliation Committee, upon which the Committee shall proceed to examine such reference(s). The option of resolution through conciliation through CCIE would be open only in the event of the parties withdrawing from arbitration proceedings and undertaking to forego their rights to proceed for further arbitration in the subject matter. However, other legal remedies

Sl. No.	GCC Clause Ref. No.	Amendment/Supplement to GCC
		would be open to the parties in the event of the conciliation proceedings not being successful. 40.6 During settlement of disputes and conciliation proceedings, both parties shall be obliged to carry out their respective obligations under the Contract.
44.	Appendix to SCC	Enclosed herewith

----- **End of Section-V (SCC)** ---

TABLE: ENVIRONMENTAL MANAGEMENT PLAN

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
Pre-construction							
Location of transmission towers and transmission line alignment and design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Tower location and line alignment selection with respect to nearest dwellings	Setback distances to nearest houses - once	POWERGRID	Part of tower siting survey and detailed alignment survey and design	Transmission Line Tower Packages
Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	PCBs not used in substation transformers or other project facilities or equipment.	Transformer design	Exclusion of PCBs in transformers stated in tender specification - once	POWERGRID	Part of tender specifications for the equipment	Substation Equipment /Packages*
		Processes, equipment and systems not to use chlorofluorocarbons (CFCs), including halon, and their use, if any, in existing processes and systems should be phased out and to be disposed of in a manner consistent with the requirements of the Government	Process, equipment and system design	Exclusion of CFCs stated in tender specification – once	POWERGRID	Part of tender specifications for the equipment	
				Phase out schedule to be prepared in case still in use – once		Part of equipment and process design	
Transmission line design	Exposure to electromagnetic	Transmission line design to comply with	Electromagnetic field strength for	Line design compliance	POWERGRID	Part of detailed alignment	Transmission Line Tower

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
	interference	the limits of electromagnetic interference from overhead power lines	proposed line design	with relevant standards - once		survey and design	Packages
Location of transmission towers and transmission line alignment and design	Impact on water bodies and land	Consideration of tower location at where they could be located to avoid water bodies or agricultural land.	Tower location and line alignment selection (distance to water and/or agricultural land)	Consultation with local authorities and land owners - once	POWERGRID	Part of tower siting survey and detailed alignment survey and design	Transmission Line Tower Packages
	Social inequities	Careful route selection to avoid existing settlements	Tower location and line alignment selection (distance to nearest dwellings or social institutions)	Consultation with local authorities and land owners - once	POWERGRID	Part of detailed tower siting and alignment survey and design	
		Minimise need to acquire agricultural land	Tower location and line alignment selection (distance to agricultural land)	Consultation with local authorities and land owners - once	POWERGRID	Part of detailed tower siting and alignment survey and design	
Encroachment into precious ecological areas	Loss of precious ecological values/ damage to precious species	Avoid encroachment by careful site and alignment selection	Tower location and line alignment selection (distance to nearest designated ecological protection area)	Consultation with local authorities - once	POWERGRID	Part of detailed siting and alignment survey /design	Transmission Line Tower Packages

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
		Minimise the need by using existing towers and RoW wherever possible	Tower location and line alignment selection	Consultation with local authorities and design engineers - once	POWERGRID	Part of detailed siting and alignment survey/design	
Transmission line through forestland	Deforestation and loss of biodiversity	Avoid encroachment by careful site and alignment selection	Tower location and line alignment selection (distance to nearest protected or reserved forest)	Consultation with local authorities - once	POWERGRID	Part of detailed siting and alignment survey/design	Transmission Line Tower Packages
		Minimise the need by using existing towers, tall towers and RoW, wherever possible		Consultation with local authorities and design engineers - once			
		Obtain statutory clearances from the Government	Statutory approvals from Government	Compliance with regulations – once for each subproject			
Encroachment into farmland	Loss of agricultural productivity	Use existing tower footings/towers wherever possible	Tower location and line alignment selection	Consultation with local authorities and design engineers - once	POWERGRID	Part of detailed alignment survey and design	Transmission Line Tower Packages
		Avoid siting new towers on farmland wherever feasible	Tower location and line alignment selection	Consultation with local authorities and design engineers - once		Part of detailed siting and alignment survey /design	

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
		Farmers compensated for any permanent loss of productive land	Design of Implementation of Crop Compensation (based on affected area)	Consultation with affected parties – once in a quarter		Prior to construction phase	
		Farmers/landowners compensated for significant trees that need to be trimmed/ removed along RoW.	Design of Implementation of Tree compensation (estimated area to be trimmed/removed)	Consultation with affected parties – once in a quarter		Prior to construction phase	
			Statutory approvals for tree trimming /removal	Compliance with regulations – once for each subproject		Part of detailed siting and alignment survey /design	
Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance.	Noise levels	Noise levels to be specified in tender documents - once	POWERGRID	Part of detailed equipment design	Substation Packages
Interference with drainage patterns/Irrigation channels	Flooding hazards/loss of agricultural production	Appropriate siting of towers to avoid channel interference	Tower location and line alignment selection (distance to nearest flood zone)	Consultation with local authorities and design engineers - once	POWERGRID	Part of detailed alignment survey and design	Transmission Line Tower Packages

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
Escape of polluting materials	Environmental pollution	Transformers designed with oil spill containment systems, and purpose-built oil, lubricant and fuel storage system, complete with spill cleanup equipment.	Equipment specifications with respect to potential pollutants	Tender document to mention specifications - once	POWERGRID	Part of detailed equipment design /drawings	Transformer specifications
		Substations to include drainage and sewage disposal systems to avoid offsite land and water pollution.	Substation sewage design	Tender document to mention detailed specifications - once	POWERGRID	Part of detailed substation layout and design /drawings	Substation packages (civil)
Equipment submerged under flood	Contamination of receptors (land, water)	Substations constructed above the high flood level (HFL) by raising the foundation pad.	Substation design to account for HFL (elevation with respect to HFL elevation)	Base height as per flood design - once	POWERGRID	Part of detailed substation layout and design /drawings	Substation packages (civil)
Explosions/Fire	Hazards to life	Design of substations to include modern fire control systems/firewalls.	Substation design compliance with fire prevention and control codes	Tender document to mention detailed specifications - once	POWERGRID	Part of detailed substation layout and design /drawings	Substation packages
		Provision of fire fighting equipment to be located close to transformers.					
Construction							
Equipment layout and installation	Noise and vibrations	Construction techniques and machinery selection seeking to minimize ground disturbance.	Construction techniques and machinery	Construction techniques and machinery creating minimal ground disturbance -	POWERGRID (Contractor through contract provisions)	Construction period	All packages

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
				once at the start of each construction phase			
Physical construction	Disturbed farming activity	Construction activities on cropping land timed to avoid disturbance of field crops (within one month of harvest wherever possible).	Timing of start of construction	Crop disturbance – Post harvest as soon as possible but before next crop - once per site	POWERGRID (Contractor through contract provisions)	Construction period	All packages
Mechanized construction	Noise, vibration and operator safety, efficient operation	Construction equipment to be well maintained.	Construction equipment – estimated noise emissions	Complaints received by local authorities - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	All packages
	Noise, vibration, equipment wear and tear	Turning off plant not in use.	Construction equipment – estimated noise emissions and operating schedules	Complaints received by local authorities - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	
Construction of roads for accessibility	Increase in airborne dust particles	Existing roads and tracks used for construction and maintenance access to the line wherever possible.	Access roads, routes (length and width of new access roads to be constructed)	Use of established roads wherever possible - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Transmission Line Tower Packages

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
	Increased land requirement for temporary accessibility	New access ways restricted to a single carriageway width within the RoW.	Access width (meters)	Access restricted to single carriageway width within RoW - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	
Temporary blockage of utilities	Overflows, reduced discharge	Temporary placement of fill in drains/canals not permitted.	Temporary fill placement (m ³)	Absence of fill in sensitive drainage areas - every 4 weeks	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
Site clearance	Vegetation	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance.	Vegetation marking and clearance control (area in m ²)	Clearance strictly limited to target vegetation - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
Trimming/cutting of trees within RoW	Fire hazards	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations.	Species-specific tree retention as approved by statutory authorities (average and maximum tree height at maturity, in meters)	Presence of target species in RoW following vegetation clearance – once per site	POWERGRID (Contractor through contract provisions)	Construction period	Transmission Line Tower Packages

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
	Loss of vegetation and deforestation	Trees that can survive pruning to comply should be pruned instead of cleared.	Species-specific tree retention as approved by statutory authorities	Presence of target species in RoW following vegetation clearance – once per site	POWERGRID (Contractor through contract provisions)	Construction period	Transmission Line Tower Packages
		Felled trees and other cleared or pruned vegetation to be disposed of as authorized by the statutory bodies.	Disposal of cleared vegetation as approved by the statutory authorities (area cleared in m ²)	Use or intended use of vegetation as approved by the statutory authorities – once per site	POWERGRID (Contractor through contract provisions)	Construction period	
Wood/vegetation harvesting	Loss of vegetation and deforestation	Construction workers prohibited from harvesting wood in the project area during their employment, (apart from locally employed staff continuing current legal activities).	Illegal wood /vegetation harvesting (area in m ² , number of incidents reported)	Complaints by local people or other evidence of illegal harvesting - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
Surplus earthwork/soil	Runoff to cause water pollution, solid waste disposal	Soil excavated from tower footings disposed of by placement along roadsides, or at nearby house blocks if requested by landowners.	Soil disposal locations and volume (m ³)	Acceptable soil disposal sites - every 2 weeks	POWER GRID (Contractor through contract provisions)	Construction period	Transmission Line Tower Packages
Substation construction	Loss of soil	Fill for the substation foundations obtained by creating or improving	Borrow area siting (area of site in m ² and estimated	Acceptable borrow areas that provide a	POWERGRID (Contractor through	Construction period	Substation Package (Civil)

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
		local water supply ponds or drains, with the agreement of local communities.	volume in m ³)	benefit - every 2 weeks	contract provisions)		
Substation construction	Water pollution	Construction activities involving significant ground disturbance (i.e. substation land forming) not undertaken during the monsoon season.	Seasonal start and finish of major earthworks (pH, BOD/COD, Suspended solids, other ?)	Timing of major disturbance activities - prior to start of construction activities	POWERGRID (Contractor through contract provisions)	Construction period	Substation Package (Civil)
Site clearance	Vegetation	Tree clearances for easement establishment to only involve cutting trees off at ground level or pruning as appropriate, with tree stumps and roots left in place and ground cover left undisturbed.	Ground disturbance during vegetation clearance (area, m ²)	Amount of ground disturbance - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Substation Package (Civil)
			Statutory approvals	Statutory approvals for tree clearances – once for each site	POWERGRID (Contractor through contract provisions)	Construction period	
Tower construction – disposal of surplus earthwork/fill	Waste disposal	Excess fill from tower foundation excavation disposed of next to roads or around houses, in agreement with the local community or landowner.	Location and amount (m ³) of fill disposal	Appropriate fill disposal locations - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	Transmission Line Tower Packages
Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Location of hazardous material storage; spill reports (type of	Fuel storage in appropriate locations and receptacles -	POWERGRID (Contractor through contract	Construction period	All Packages

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
			material spilled, amount (kg or m ³) and action taken to control and clean up spill)	every 2 weeks	provisions)		
Construction schedules	Noise nuisance to neighbouring properties	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Timing of construction (noise emissions, [dB(a)])	Daytime construction only - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
Provision of facilities for construction workers	Contamination of receptors (land, water, air)	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.	Amenities for Workforce facilities	Presence of proper sanitation, water supply and waste disposal facilities - once each new facility	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
Encroachment into farmland	Loss of agricultural productivity	Use existing access roads wherever possible	Usage of existing utilities	Complaints received by local people /authorities - every 2 weeks	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
		Ensure existing irrigation facilities are maintained in working condition	Status of existing facilities				
		Protect /preserve topsoil and reinstate after construction completed	Status of facilities (earthwork in m ³)				
		Repair /reinstate damaged bunds etc after construction completed	Status of facilities (earthwork in m ³)				

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
	Social inequities	Compensation for temporary loss in agricultural production	Implementation of Crop compensation (amount paid, dates, etc.)	Consultation with affected parties – once in a quarter	POWERGRID	Prior to construction	
Uncontrolled erosion/silt runoff	Soil loss, downstream siltation;	Need for access tracks minimised, use of existing roads.	Design basis and construction procedures (suspended solids in receiving waters; area re-vegetated in m ² ; amount of bunds constructed [length in meter, area in m ² , or volume in m ³])	Incorporating good design and construction management practices – once for each site	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
		Limit site clearing to work areas					
		Regeneration of vegetation to stabilise works areas on completion (where applicable)					
		Avoidance of excavation in wet season					
		Water courses protected from siltation through use of bunds and sediment ponds					
Nuisance to nearby properties	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices.	Contract clauses	Incorporating good construction management practices – once for each site	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
		As much as possible existing access ways will be used.	Design basis and layout	Incorporating good design engineering practices – once for each site			

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
		Productive land will be reinstated following completion of construction	Reinstatement of land status (area affected, m ²)	Consultation with affected parties – twice – immediately after completion of construction and after the first harvest			
	Social inequities	Compensation will be paid for loss of production, if any.	Implementation of Tree/Crop compensation (amount paid)	Consultation with affected parties – once in a quarter	POWERGRID	Prior to construction	
Flooding hazards due to construction impediments of natural drainage	Flooding and loss of soils, contamination of receptors (land, water)	Avoid natural drainage pattern /facilities being disturbed /blocked /diverted by the on-going construction activities	Contract clauses (e.g., suspended solids and BOD/COD in receiving water)	Incorporating good construction management practices – once for each site	POWERGRID (Contractor through contract provisions)	Construction period	All packages
Equipment submerged under flood	Contamination of receptors (land, water)	Equipment stored at secure place above the high flood level (HFL).	Store room level to be above HFL (elevation difference in meters)	Store room level as per flood design - once	POWERGRID	Construction period	# All packages
Inadequate siting of borrow areas (quarry areas)	Loss of land values	Existing borrow sites will be used to source aggregates, therefore, no need to develop new sources of aggregates	Contract clauses	Incorporating good construction management practices – once for each	POWERGRID (Contractor through contract provisions)	Construction period	Substation Packages

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
Health and safety	Injury and sickness of workers and members of the public	Contract provisions specifying minimum requirements for construction camps Contractor to prepare and implement a health and safety plan. Contractor to arrange for health and safety training sessions	Contract clauses (number of incidents and total lost-work days caused by injuries and sickness)	Contract clauses compliance – once every quarter site	POWERGRID (Contractor through contract provisions)	Construction period	All Packages
Inadequate construction stage monitoring	Likely to maximise damages	Training of POWERGRID environmental monitoring personnel Implementation of effective environmental monitoring and reporting system using checklist of all contractual environmental requirements Appropriate contract clauses to ensure satisfactory implementation of contractual environmental mitigation measures.	Training schedules Respective contract checklists and remedial actions taken thereof. Compliance report related to environmental aspects for the contract	Number of programs attended by each person – once a year Submission of duly completed checklists of all contracts for each site - once Submission of duly completed compliance report for each contract - once	POWERGRID	Routinely throughout construction period	All Packages
Operation and Maintenance							
Location of transmission	Exposure to safety related	Setback of dwellings to overhead line route	Compliance with setback distances	Setback distances to	POWERGRID	During operations	Transmission Line Tower

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
towers and transmission line alignment and design	risks	designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	(“as-built” diagrams)	nearest houses – once in quarter			Packages
Equipment submerged under flood	Contamination of receptors (land, water)	Equipment installed above the high flood level (HFL) by raising the foundation pad.	Substation design to account for HFL (“as-built” diagrams)	Base height as per flood design - once	POWERGRID	During operations	All packages
Oil spillage	Contamination of land/nearby water bodies	Substation transformers located within secure and impervious bunded areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks.	Substation bunding (“as-built” diagrams)	Bunding capacity and permeability - once	POWERGRID	During operations	Substation Packages*
Inadequate provision of staff/workers health and safety during operations	Injury and sickness of staff /workers	Careful design using appropriate technologies to minimise hazards	Usage of appropriate technologies (lost work days due to illness and injuries)	Preparedness level for using these technologies in crisis – once each year	POWERGRID	Design and operation	All Packages
		Safety awareness raising for staff.	Training/awareness programs and mock drills	Number of programs and percent of staff /workers covered – once each year			
		Preparation of fire emergency action plan and training given to staff on implementing emergency action plan					

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
		Provide adequate sanitation and water supply facilities	Provision of facilities	Complaints received from staff /workers every 2 weeks			
Electric Shock Hazards	Injury/mortality to staff and public	Careful design using appropriate technologies to minimise hazards	Usage of appropriate technologies (number of injury incidents, lost work days)	Preparedness level for using these technologies in crisis – once a month	POWERGRID	Design and Operation	All Packages
		Security fences around substations	Maintenance of fences	Report on maintenance – every 2 weeks			
		Barriers to prevent climbing on/dismantling of transmission towers	Maintenance of barriers				
		Appropriate warning signs on facilities	Maintenance of warning signs				
		Electricity safety awareness raising in project areas	Training /awareness programs and mock drills for all concerned parties	Number of programs and percent of total persons covered – once each year			
Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	Processes, equipment and systems using cholofluorocarbons (CFCs), including halon, should be phased out and to be disposed of in a manner consistent with the requirements of the Government.	Process, equipment and system design	Phase out schedule to be prepared in case still in use – once in a quarter	POWERGRID	Operations	Substation Packages*

Project activity /stage	Potential impact	Proposed mitigation measure	Parameter to be monitored	Measurement and frequency	Institutional responsibility	Implementation schedule	Applicability
Transmission line maintenance	Exposure to electromagnetic interference	Transmission line design to comply with the limits of electromagnetic interference from overhead power lines	Required ground clearance (meters)	Ground clearance - once	POWERGRID	Operations	Transmission Line Tower Packages
Noise related	Nuisance to neighbouring properties	Substations sited and designed to ensure noise will not be a nuisance.	Noise levels (dB(a))	Noise levels at boundary nearest to properties and consultation with affected parties if any - once	POWERGRID	Operations	Substation Packages*

*Substation packages also include Transformer, Reactor, FSC / TCSC Packages

SECTION – VI

SAMPLE FORMS AND PROCEDURES (FORMS)

SAMPLE FORMS AND PROCEDURES (FORMS)

Preamble

This Section (Section -VI) of the bidding documents [named as Sample Forms and Procedures (FORMS)] provides proforma to be used by the bidders at the time of their bid preparation and by the Contractor subsequent to the award of Contract.

The Bidder shall complete, sign and submit with its bid the relevant FORMS to be used unamended, in accordance with the requirements included in the Bidding Documents.

The Bidder shall provide the Bid Security, either in the form included hereafter or in another form acceptable to the Employer, pursuant to the provisions in the instructions to Bidders.

The Form of Contract Agreement shall be used unamended, except for the need to complete Article 1.1 (Contract Documents), as appropriate and as may be required to suit the specific requirement of the Contract. The form shall also include the Appendices listed, as required, which should be completed according to the instructions for their completion provided at the beginning of each Appendix. The Price Schedule deemed to form part of the contract shall be modified according to any corrections or modifications to the accepted bid resulting from price corrections, pursuant to the provisions of the Instructions to Bidders.

The Performance Security(ies) and Bank Guarantee for Advance Payment forms should not be completed by the bidders at the time of their bid preparation. Only the successful Bidder will be required to provide the Performance Security(ies) and Bank Guarantee for Advance Payment, according to one of the forms indicated herein or in another form acceptable to the Employer and pursuant to the provisions of the General and Special Conditions of Contract, respectively.

Depending on specific facts and circumstances related to the Bid, other specific agreement, if any, and the contract, the text of the Forms herein may need to be modified to some extent. The Employer reserves the right to make such modifications in conformity with such specific facts and circumstances and rectify and consequent discrepancies, if any. However, modifications, if any, to the text of the Forms that may be required in the opinion of the Bidder/Contractor shall be effected only if the same is approved by the Employer. The Employer's decision in this regard shall be final and binding.

1. BID FORMS AND PRICE SCHEDULES

1.1 Bid Form

Please see Volume - III.

1.2 Price Schedule

Please see Volume - III

2. BID SECURITY FORM

Deleted

3a. FORM OF NOTIFICATION BY THE EMPLOYER TO THE BANK
(Applicable for Forfeiture of Bank Guarantee)

To: *(insert Name and Address of the issuing Bank)*

Ref.: Forfeiture of Bid Security Amount against Bank Guarantee No. dated
..... for, issued by you on behalf of M/s.*(insert name of the Bidder)*

Dear Sirs,

Please refer to the subject Bank Guarantee executed by you in our favour for
..... as Bid Security for the bid submitted by M/s.*(insert name of the Bidder)* against *(insert name of the Package)* ; Specification No.
.....

As per the terms of the said guarantee, the bank has guaranteed and undertaken to pay immediately on demand by the Employer the amount of without any reservation, protest, demur and recourse. Further, any demand made by the Employer shall be conclusive and binding on the Bank irrespective of any dispute or difference raised by the Bidder.

In terms of the said guarantee, we hereby submit our claim/demand through this letter for remittance of Bid Security amount to *(insert name of the Employer)* owing to the occurrence of the condition referred to at Sl. No. The Bank is requested to remit the full guaranteed sum towards proceeds of the bid security in the form of Demand Draft in favour of '.... *(insert name of the Employer)*', payable at*(insert place of the Employer)*....'.

Thanking you,

For.....*(Name of the Employer)*

(AUTHORISED SIGNATORY)

Copy to:
.....*(Registered Office of the Bank)*....

3b. FORM OF NOTIFICATION BY THE EMPLOYER TO THE BANK
(Applicable for conditional claim pending extension of Bank Guarantee by the Bidder)

To: *(insert Name and Address of the issuing Bank)*

Ref.: Conditional Claim against Bank Guarantee No. dated for
..... valid up to issued by you on behalf of M/s.*(insert name of the Bidder)*

Dear Sirs,

Please refer to the subject Bank Guarantee executed by you in our favour on behalf of M/s.*(insert name of the Bidder)*, who have submitted this Bank Guarantee to us towards Bid Security against *(insert name of the Package)* ; Specification No.

We, ... *(insert name of the Employer)* do hereby request you to lodge our claim/demand against the subject Bank Guarantee for full guaranteed sum. Kindly note that this claim/demand against the subject Bank Guarantee is without any further notice in case the amendment to Bank Guarantee No. dated extending its validity upto is not got arranged by*(insert name of the Bidder)* in our favour and are not received by us upto In such an event you are requested to remit the full guaranteed amount in terms of the subject guarantee in its letter and spirit and proceeds of this Bank Guarantee shall be forwarded to us in form of demand draft in favour of '.... *(insert name of the Employer)*, payable at*(insert place of the Employer)*....'.

This is without prejudice to our right under this guarantee and under the law.

Thanking you,

For.....*(Name of the Employer)*

(AUTHORISED SIGNATORY)

Copy to:
(insert Name and Address of the Bidder)

- You are requested to do the needful so that the amendment to the subject Bank Guarantee extending the validity up to is received by us by

4. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT'

4a. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT' FOR SUPPLY OF GOODS CONTRACT

Ref. No. :

Date :

.....(insert Contractor's Name & Address).....

.....

.....

[in case of Joint Venture, the aforesaid details shall be of the Lead Partner and the following shall also be included:

(Lead Partner of the Joint Venture of M/s. and M/s.)]

Attn : Mr.....

Sub. : Notification of Award for '**Supply of Goods Contract**' for *(insert name of the Package)* Specification No.: Domestic Competitive Bidding.
(Project Funding: Domestic).

Dear Sir,

1.0 REFERENCE

This has reference to the following:

1.1 Our Invitation for Bids (IFB) dated

1.2 Bidding documents for the subject package issued to you vide our letter Ref. No. dated, comprising the following:

a) Conditions of Contract Volume-I
(Document Code No.)

b) Technical Specifications Volume-II
(Document Code No.)

c) Bid Form, Price Schedules Volume-III
& Technical Data Sheets
(Document Code No.)

1.2.1 Amendment/Errata No. to Bidding Documents issued to you vide our letter no. dated
(Applicable only if any Errata/Amendment to the Bidding Documents has been issued subsequently)

- 1.2.2 Clarifications to the Bidding Documents, pursuant to pre-bid conference held on, issued to you vide our letters no. dated *(Use as applicable)*

(Applicable only if any clarification to the Bidding Documents has been issued subsequently)

(INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO THE BIDDER AFTER ISSUANCE OF BIDDING DOCUMENTS UP TO BID OPENING)

- 1.3 First envelope of your Bid submitted/the Bid submitted by the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) for the subject package under Proposal reference no. dated was opened on *(Use as applicable)*

- 1.4 Intimation for Opening of Second Envelope issued to you vide our letter no. dated

- 1.5 Second Envelope of your Bid/the Bid by the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) under proposal reference no. dated was opened on.....*(Use as applicable)*

- 1.6 Post bid discussions we had with you on various dates from to resulting into the Minutes of Meeting/ Record Notes of Post Bid Discussions enclosed as APPENDIX (NOA)-1 with this Notification of Award.

2.0 AWARD OF CONTRACT AND ITS SCOPE

- 2.1 We confirm having accepted your Bid/Bid of the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) *(Use as applicable)* (referred to at para 1.3 & 1.5 above) read in conjunction with all the specifications, terms & conditions of the Bidding Documents (referred to at para 1.2, 1.2.1 & 1.2.2 *[modify as applicable]* above) and specific confirmations recorded in the Record Notes of Post Bid Discussions (referred to at para 1.6 above), and award on you/the JV*(use as applicable)* the 'Supply of Goods Contract' (also referred to as the 'First Contract') covering inter-alia Ex-works supply of all equipment and materials including Type Testing to be conducted (If Applicable), required for the complete execution of the *(insert name of Package alongwith name of the Project)*, as detailed in the documents referred hereinabove. The scope of work inter-alia includes the following:

..... *(Indicate brief Scope of Work)*

The scope of work under this Notification of Award (NOA) shall also include all such items which are not specifically mentioned in the Bidding Documents and/or

your bid but are necessary for the successful completion of your scope under the Contract for the construction of (*insert name of Package alongwith name of the Project*), unless otherwise specifically excluded in the Bidding Documents or in this NOA.

- 2.1.1 You, the Lead Partner of the JV, along with M/s., the Other Partner of JV, shall be liable jointly and severally for the execution of the Contract in accordance with terms and conditions of the Contract. As per the Power of Attorney furnished in your favour by the Joint Venture, as enclosed with Bid Proposal of the JV, you shall act as the Partner In-charge (Lead Partner) of the above Joint Venture for execution of the Contract. (*This provision shall be included only in case the Bidder is a Joint Venture*)
- 2.2 The notification for award of Contract for performance of all other activities, as set forth in the Bidding Documents, viz.

..... (*Indicate brief scope of work of the Second Contract*)

has been issued on you vide our NOA no. dated (hereinafter called the "Second Contract" or "Supply of Services Contract").

Notwithstanding the award of work under two separate Contracts in the aforesaid manner, you/the JV (*use as applicable*) shall be overall responsible to ensure the execution of both the Contracts to achieve successful completion and taking over of the works under the package by the Employer as per the requirements stipulated in the Bidding Documents. It is expressly understood and agreed by you/the JV (*use as applicable*) that any default or breach under the 'Second Contract' shall automatically be deemed as a default or breach of this 'First Contract' also and vice-versa, and any such default or breach or occurrence giving us a right to terminate the 'Second Contract', either in full or in part, and/or recover damages there under, shall give us an absolute right to terminate this Contract, at your/JV's (*use as applicable*) risk, cost and responsibility, either in full or in part and/or recover damages under this 'First Contract' as well. However, such default or breach or occurrence in the 'Second Contract', shall not automatically relieve you/the JV (*use as applicable*) of any of your/JV's (*use as applicable*) obligations under this 'First Contract'. It is also expressly understood and agreed by you/the JV (*use as applicable*) that the equipment/materials supplied by you/the JV (*use as applicable*) under this 'First Contract', when erected, installed & commissioned by you under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

3.0 CONTRACT PRICE

- 3.1 The total Contract Price for the entire scope of work under this Contract shall be (*Specify the currency and the amount in figures & words*) as per the following break-up:

Sl. No.	Price Component	Amount
1.	Ex-Works Price component	
2.	Type Test Charges (if Applicable)	
Total for Supply of Goods Contract		

- 3.2 Notwithstanding the break-up of the Contract Price, the Contract shall, at all times, be construed as a single source responsibility Contract and any breach in any part of the Contract shall be treated as a breach of the entire Contract.
- 4.0 You/The JV (*use as applicable*) are/is required to furnish at the earliest a Performance Security(ies), as per the Bidding Documents, for an amount of (*Specify the value*) i.e. equal to 10% (Ten percent) of the Contract Price, and valid upto and including and any other securities as per the Bidding Documents.
- (*In case any other performance security is required to be furnished, the same is to be mentioned here*)
- 5.0 For release of advance payment (admissible as per the bidding documents) equal to% of the Ex-works Price component of the Contract Price, you are, inter-alia, required to furnish a Bank Guarantee for **[[110% (one hundred ten percent) of the amount of Advance]]**. The validity of the Advance Bank Guarantee shall be up to and including Further, please note that furnishing of all the Contract Performance Securities under the 'First Contract' and 'Second Contract' shall be one of the conditions precedent to release of advance under this Contract.
- 6.0 All the bank guarantees shall be furnished from an eligible bank as described in the Bidding Documents.
- 7.0 The schedule for Taking Over/Completion of Facilities by the Employer upon successful completion of the (*insert name of Package alongwith name of the Project*) shall be ... (*indicate the completion schedule*) months from the date of issue of this Notification of Award for all contractual purposes.
- 8.0 This Notification of Award constitutes formation of the Contract and comes into force with effect from the date of issuance of this Notification of Award.
- 9.0 You shall enter into a Contract Agreement with us within twenty-eight (28) days from the date of this Notification of Award.
- 10.0 This Notification of Award is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including the enclosed Appendix as a token of your acknowledgement.

Please take the necessary action to commence the work and confirm action.

Yours faithfully,

For and on behalf of

.....(*Name of the Employer*).....

(*Authorised Signatory*)

Enclosures:

APPENDIX (NOA) – 1 - Record Notes of Post - Bid Discussions held on various dates
from to

4b. FORM OF 'NOTIFICATION OF AWARD OF CONTRACT' FOR SUPPLY OF SERVICES CONTRACT

Ref. No. :

Date :

.....(*insert Contractor's Name & Address*).....

.....

.....

[in case of Joint Venture, the aforesaid details shall be of the Lead Partner and the following shall also be included:

(Lead Partner of the Joint Venture of M/s. and M/s.)]

Attn : Mr.....

Sub. : Notification of Award for 'Supply of Services Contract' for (*insert name of the Package*) Specification No.: Domestic Competitive Bidding. (Project Funding: Domestic).

Dear Sir,

1.0 REFERENCE

This has reference to the following:

1.1 Our Invitation for Bids (IFB) dated

1.2 Bidding documents for the subject package issued to you vide our letter Ref. No. dated, comprising the following:

a) Conditions of Contract Volume-I
(Document Code No.)

b) Technical Specifications Volume-II
(Document Code No.)

c) Bid Form, Price Schedules Volume-III
& Technical Data Sheets
(Document Code No.)

1.2.1 Amendment/Errata No. to Bidding Documents issued to you vide our letter no. dated
(Applicable only if any Errata/Amendment to the Bidding Documents has been issued subsequently)

- 1.2.2 Clarifications to the Bidding Documents, pursuant to pre-bid conference held on, issued to you vide our letters no. dated *(Use as applicable)*

(Applicable only if any clarification to the Bidding Documents has been issued subsequently)

(INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO THE BIDDER AFTER ISSUANCE OF BIDDING DOCUMENTS UP TO BID OPENING)

- 1.3 First envelope of your Bid submitted/the Bid submitted by the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) for the subject package under Proposal reference no. dated was opened on *(Use as applicable)*
- 1.4 Intimation for Opening of Second Envelope issued to you vide our letter no. dated
- 1.5 Second Envelope of your Bid/the Bid by the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) under proposal reference no. dated was opened on.....*(Use as applicable)*
- 1.6 Post bid discussions we had with you on various dates from to resulting into the Minutes of Meeting/ Record Notes of Post Bid Discussions enclosed as APPENDIX (NOA)-1 with this Notification of Award.

2.0 AWARD OF CONTRACT AND ITS SCOPE

- 2.1 We confirm having accepted your Bid/Bid of the Joint Venture (JV) of M/s. (Lead Partner) and M/s. (Other Partner) *(Use as applicable)* (referred to at para 1.3 & 1.5 above) read in conjunction with all the specifications, terms & conditions of the Bidding Documents (referred to at para 1.2, 1.2.1 & 1.2.2 *[modify as applicable]* above) and specific confirmations recorded in the Record Notes of Post Bid Discussions (referred to at para 1.6 above), and award on you/the JV*(use as applicable)* the "Supply of Services Contract" (also referred to as the 'Second Contract') for performance of all other activities, as set forth in the documents, viz. *(Indicate brief scope of work)* for the *(insert name of Package alongwith name of the Project)*....

The scope of work under this Notification of Award (NOA) shall also include all such items which are not specifically mentioned in the Bidding Documents and/or your bid but are necessary for the successful completion of your scope under the Contract for the construction of *(insert name of Package alongwith name of the Project)*, unless otherwise specifically excluded in the Bidding Documents or in this NOA.

2.1.1 You, the Lead Partner of the JV, along with M/s., the Other Partner of JV, shall be liable jointly and severally for the execution of the Contract in accordance with terms and conditions of the Contract. As per the Power of Attorney furnished in your favour by the Joint Venture, as enclosed with Bid Proposal of the JV, you shall act as the Partner In-charge (Lead Partner) of the above Joint Venture for execution of the Contract. *(This provision shall be included only in case the Bidder is a Joint Venture)*

2.2 The notification for award of Contract for Ex-works Supply of all equipment and materials including Type Testing to be conducted (if applicable), as set forth in the documents, viz.

..... *(Indicate brief scope of work of the First Contract)*

has been issued on you vide our NOA no. dated (hereinafter called the "Supply of Goods Contract" or "First Contract").

Notwithstanding the award of contract under two separate contracts in the aforesaid manner, you/the JV *(use as applicable)* shall be overall responsible to ensure the execution of both the contracts to achieve successful completion and taking over of the works under the package by the Employer as per the requirements stipulated in the Bidding documents. It is expressly understood and agreed by you/the JV *(use as applicable)* that any default or breach under the 'First Contract' shall automatically be deemed as a default or breach of this 'Second Contract' also and vice-versa, and any such default or breach or occurrence giving us a right to terminate the 'First Contract', either in full or in part, and/or recover damages there under, shall give us an absolute right to terminate this Contract, at your/JV's *(use as applicable)* risk, cost and responsibility, either in full or in part and/or recover damages under this 'Second Contract' as well. However, such default or breach or occurrence in the 'First Contract', shall not automatically relieve you/the JV *(use as applicable)* of any of your obligations under this 'Second Contract'. It is also expressly understood and agreed by you/the JV *(use as applicable)* that the equipment/materials supplied by you/the JV *(use as applicable)* under the 'First Contract', when erected, installed & commissioned by you/the JV *(use as applicable)* under this 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

3.0 CONTRACT PRICE

3.1 The total Contract Price for the entire scope of work under this Contract shall be *(Specify the amount in figures & words)* as per the following break-up:

Sl. No.	Price Component	Amount
1.	Local Transportation, In-transit insurance, loading, unloading Charges	
2.	Installation Services	

Sl. No.	Price Component	Amount
3.	Training Charges (if applicable)	
4.	Maintenance Charges during Defect Liability Period and Annual Maintenance Charges after Defect Liability Period	
Total for Supply of Services Contract		

- 3.2 Notwithstanding the break-up of the Contract Price, the Contract shall, at all times, be construed as a single source responsibility Contract and any breach in any part of the Contract shall be treated as a breach of the entire Contract.
- 4.0 You/the JV(*use as applicable*) are/is required to furnish at the earliest a Performance Security(ies), as per the Bidding Documents, for an amount of (*Specify the value*) i.e. equal to 10% (Ten percent) of the Contract Price, and valid upto and including and any other securities as per the Bidding Documents.
- (In case any other performance security is required to be furnished, the same is to be mentioned here)*
- 5.0 All the bank guarantees shall be furnished from an eligible bank as described in the Bidding Documents.
- 6.0 The schedule for Taking Over/Completion of Facilities by the Employer upon successful completion of the (*insert name of Package alongwith name of the Project*) shall be ... (*indicate the completion schedule*) months from the date of issue of this Notification of Award for all contractual purposes.
- 7.0 This Notification of Award constitutes formation of the Contract and comes into force with effect from the date of issuance of this Notification of Award.
- 8.0 You shall enter into a Contract Agreement with us within twenty-eight (28) days from the date of this Notification of Award.
- 9.0 This Notification of Award is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including the enclosed Appendix as a token of your acknowledgement.

Please take the necessary action to commence the work and confirm action.

Yours faithfully,

For and on behalf of

.....(*Name of the Employer*).....

(Authorised Signatory)

Enclosures:

APPENDIX (NOA) – 1 - Record Notes of Post - Bid Discussions held on various dates
from to

Note:

Instructions indicated in italics in this notification of award are to be taken care of by the issuing authority. The Forms may be modified appropriately to suit the specific requirement of the Contract.

5. FORM OF CONTRACT AGREEMENT

[Alternative - a]

SUPPLY OF GOODS CONTRACT AGREEMENT BETWEEN (*Name of Employer*)
..... AND M/s. (*Name of Contractor*)/JOINT VENTURE (JV) OF
M/s. (*Name of Lead Partner*).... (THE LEAD PARTNER OF THE JV) AND M/s.
.....(*Name of Other Partner*)..... (THE PARTNER OF THE JV) [*Use as applicable*]

THIS CONTRACT AGREEMENT No. (also referred to as 'Ex-Works Supply
Contract/the First Contract') is made on the day of 20....

BETWEEN

(1) (*Name of Employer*)..... a company incorporated under the laws of
Companies Act 1956 and having its Registered Office at(*registered address of the
Employer*) and its Corporate Office at(*address of the
Employer*)..... (hereinafter called "the Employer" and also referred to as ".....(*insert
abbreviated name of the Employer*)")

and

(2) M/s (*Name of Contractor*), a company incorporated under the laws of
Companies Act 1956 and having its Principal place of business at(*Address of
Contractor*) and Registered Office at(*Registered address of
Contractor*) (hereinafter called "the Contractor" and also referred to as ".....(*insert
abbreviated name of the Contractor*)")

or

Joint Venture (JV) of M/s (*Name of Lead Partner*) (the Lead Partner of
JV), a company incorporated under the laws of Companies Act 1956 and having its Principal
place of business at(*Address of Lead Partner*) and Registered
Office at(*Registered address of Lead Partner*) and M/s (*Name
of Other Partner*) (the Partner of JV), a company incorporated under the laws of
Companies Act 1956 and having its Principal place of business at(*Address of Other
Partner*) and Registered Office at(*Registered address of Other
Partner*) (hereinafter called "the Contractor" and also referred to as "Joint
Venture"/the 'JV'")
(*Applicable only in case of Joint Venture*)

WHEREAS the Employer desires to engage the Contractor for the Ex-works supply of all
equipment and materials including Type Testing to be conducted inter-alia including
..... (*Indicate brief scope of work*) for the complete execution of
the (*insert name of Package alongwith name of the Project*)..... as detailed in the Contract
Document ("the Facilities"), and the Contractor has agreed to such engagement upon and
subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1. Contract Documents

1.1 Contract Documents (Reference GCC Clause 2.2)

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

VOLUME - A

1. This Contract Agreement and the Appendices thereto.
2. Notification of Award Ref. No. dated

VOLUME - B

3. "Bidding Documents" comprising of the following:
 - (a) Volume -I of Bidding Documents (Document Code No.:), read in conjunction with Amendments to to the Bidding Documents.
 - (b) Volume -II of Bidding Documents (Document Code No.:), comprising of Technical Specifications.

VOLUME - C

4. Bid Submitted by the Contractor.

(Only relevant extracts are attached herewith for easy reference. Should the circumstances warrant, the original Bid along with the enclosures thereof, shall be referred to.).

1.2 Order of Precedence (Reference GCC Clause 2)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 Definitions (Reference GCC Clause 1/SCC Clause 1)

- 1.3.1 Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract/Special Conditions of Contract.

Article 2. Contract Price and Terms of Payment

2.1 Contract Price (Reference GCC Clause 7)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of (*amount in words*) (*.....(amount in figures)*), or such other sums as may be determined in accordance with the terms and conditions of the Contract. The break-up of the Contract price is as under:

Sl. No.	Price Component	Amount
1.	Ex-Works Price Component	
2.	Type Test Charges (if applicable)	
Total for Supply of Goods Contract		

The detailed break-up of Contract Price is given in the relevant Appendices hereto.

2.2 Terms of Payment (Reference GCC Clause 8)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in Appendix 1 (Terms and Procedures of Payment) hereto.

Article 3. Effective Date for Determining Time for Completion

3.1 Effective Date (Reference GCC Clause 1)

The Time of Completion of Facilities shall be determined from the date of the Notification of Award i.e., from

Article 4. Appendices

The Appendices listed in the List of Appendices, as mentioned below, shall be deemed to form an integral part of this Contract Agreement.

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

List of Appendices

Appendix 1	Terms and Procedures of Payment
Appendix 2	Price Adjustment
Appendix 3	Insurance Requirements
Appendix 4	Time Schedule

Appendix 5	List of Approved Subcontractors
Appendix 6	Scope of Works and Supply by the Employer
Appendix 7	List of Document for Approval or Review
Appendix 8	Guarantees, Liquidated Damages for Non-Performance
Appendix 9	Contract Co-ordination Procedure
Appendix 10^	Summary of Detailed Price Break-up
Appendix 10A^	Detailed Price Break-up of Price
Appendix 10B^	Detailed Price Break-up of Charges
Appendix 11	Integrity Pact
Appendix 12	Safety Pact

[^ to be appended at the Stage of Contract Award.]

Article 5.

The Contract Agreement No. has also been made on the day of 20...., between the Employer and the Contractor for the Supply of Services Contract (hereinafter referred to as the "Second Contract") for the subject package which includes performance of all the services interalia including (Indicate brief scope of work) for the complete execution of the (insert name of Package alongwith name of the Project).....

Notwithstanding the award of contract under two separate contracts in the aforesaid manner, the Contractor shall be overall responsible to ensure the execution of both the contracts to achieve successful completion and taking over of the facilities by the Employer as per the requirements stipulated in the Contract. It is expressly understood and agreed by the Contractor that any default or breach under the 'Second Contract' shall automatically be deemed as a default or breach of this 'First Contract' also and vice-versa and any such breach or occurrence or default giving the Employer a right to terminate the 'Second Contract' either in full or in part, and/or recover damages there under that Contract, shall give the Employer an absolute right to terminate this Contract at the Contractor's risk, cost and responsibility, either in full or in part and /or recover damages under this 'First Contract' as well. However, such breach or default or occurrence in the 'Second Contract' shall not automatically relieve the Contractor of any of its responsibility/ obligations under this 'First Contract'. It is also expressly understood and agreed by the Contractor that the equipment /materials supplied by the Contractor under this 'First Contract' when installed and commissioned by the Contractor under the 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by for and
on behalf of the Employer

.....
Signature

.....
Title

in the presence of

Signed by for and
on behalf of the Contractor

.....
Signature

.....
Title

in the presence of

5. FORM OF CONTRACT AGREEMENT

[Alternative – b]

SUPPLY OF SERVICES CONTRACT AGREEMENT BETWEEN (*Name of Employer*) AND M/s. (*Name of Contractor*)/JOINT VENTURE (JV) OF M/s. (*Name of Lead Partner*).... (THE LEAD PARTNER OF THE JV) AND M/s.(*Name of Other Partner*)..... (THE PARTNER OF THE JV) [*Use as applicable*]

THIS CONTRACT AGREEMENT No. (also referred to as 'Services Contract/the Second Contract') is made on the day of 20.....

BETWEEN

(1) (*Name of Employer*)..... a company incorporated under the laws of Companies Act 1956 and having its Registered Office at(*registered address of the Employer*) and its Corporate Office at(*address of the Employer*)..... (hereinafter called "the Employer" and also referred to as ".....(*insert abbreviated name of the Employer*)")

and

(2) M/s (*Name of Contractor*), a company incorporated under the laws of Companies Act 1956 and having its Principal place of business at(*Address of Contractor*) and Registered Office at(*Registered address of Contractor*) (hereinafter called "the Contractor" and also referred to as ".....(*insert abbreviated name of the Contractor*)")

or

Joint Venture (JV) of M/s (*Name of Lead Partner*) (the Lead Partner of JV), a company incorporated under the laws of Companies Act 1956 and having its Principal place of business at(*Address of Lead Partner*) and Registered Office at(*Registered address of Lead Partner*) and M/s (*Name of Other Partner*) (the Partner of JV), a company incorporated under the laws of Companies Act 1956 and having its Principal place of business at(*Address of Other Partner*) and Registered Office at(*Registered address of Other Partner*) (hereinafter called "the Contractor" and also referred to as "Joint Venture"/the 'JV'")
(*Applicable only in case of Joint Venture*)

WHEREAS the Employer desires to engage the Contractor for providing all the services inter-alia including (*Indicate brief scope of work*) for the complete execution of the (*insert name of Package alongwith name of the Project*)..... as detailed in the Contract Document ("the Facilities"), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1. Contract Documents

1.1 Contract Documents (Reference GCC Clause 2.2)

The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:

VOLUME - A

1. This Contract Agreement and the Appendices thereto.
2. Notification of Award Ref. No. dated

VOLUME - B

3. "Bidding Documents" comprising of the following:
 - (a) Volume -I of Bidding Documents (Document Code No.:), read in conjunction with Amendments to to the Bidding Documents.
 - (b) Volume -II of Bidding Documents (Document Code No.:), comprising of Technical Specifications.

VOLUME - C

4. Bid Submitted by the Contractor.

(Only relevant extracts are attached herewith for easy reference. Should the circumstances warrant, the original Bid along with the enclosures thereof, shall be referred to.).

1.2 Order of Precedence (Reference GCC Clause 2)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.

1.3 Definitions (Reference GCC Clause 1/SCC Clause 1)

- 1.3.1 Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions of Contract/Special Conditions of Contract.

Article 2. Contract Price and Terms of Payment

2.1 Contract Price (Reference GCC Clause 7)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of (*amount in words*) (*.....(amount in figures)*), or such other sums as may be determined in accordance with the terms and conditions of the Contract. The break-up of the Contract price is as under:

Sl. No.	Price Component	Amount
1.	Local Transportation, In-transit insurance, loading, unloading Charges	
2.	Installation Services	
3.	Training Charges (if applicable)	
4.	Maintenance Charges during Defect Liability Period and Annual Maintenance Charges after Defect Liability Period	
Total for Supply of Services Contract		

The detailed break-up of Contract Price is given in the relevant Appendices hereto.

2.2 Terms of Payment (Reference GCC Clause 8)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in Appendix 1 (Terms and Procedures of Payment) hereto.

Article 3. Effective Date for Determining Time for Completion

3.1 Effective Date (Reference GCC Clause 1)

The Time of Completion of Facilities shall be determined from the date of the Notification of Award i.e., from

Article 4. Appendices

The Appendices listed in the List of Appendices, as mentioned below, shall be deemed to form an integral part of this Contract Agreement.

Reference in the Contract to any Appendix shall mean the Appendices attached hereto, and the Contract shall be read and construed accordingly.

List of Appendices

Appendix 1	Terms and Procedures of Payment
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Appendix 10^	Summary of Detailed Price Break-up
Appendix 10A^	Detailed Price Break-up of Price
Appendix 10B^	Detailed Price Break-up of Charges
Appendix 11	Integrity Pact
Appendix 12	Safety Pact

[^ to be appended at the Stage of Contract Award.]

Article 5.

The Contract Agreement No. has also been made on the day of 20..., between the Employer and the Contractor for the Supply of Goods Contract (hereinafter referred to as the "First Contract") for the subject package which includes Ex-works supply of all equipment and materials including Type Testing to be conducted interalia including (*Indicate brief scope of work*) for the complete execution of the (*insert name of Package alongwith name of the Project*).....

Notwithstanding the award of contract under two separate contracts in the aforesaid manner, the Contractor shall be overall responsible to ensure the execution of both the contracts to achieve successful completion and taking over of the facilities by the Employer as per the requirements stipulated in the Contract. It is expressly understood and agreed by the Contractor that any default or breach under the 'First Contract' shall automatically be deemed as a default or breach of this 'Second Contract' also and vice-versa and any such breach or occurrence or default giving the Employer a right to terminate the 'First Contract' either in full or in part, and/or recover damages there under that Contract, shall give the Employer an absolute right to terminate this Contract at the Contractor's risk, cost and responsibility, either in full or in part and /or recover damages under this 'Second Contract' as well. However, such breach or default or occurrence in the 'First Contract' shall not automatically relieve the Contractor of any of its responsibility/ obligations under this 'Second Contract'. It is also expressly understood and agreed by the Contractor that the equipment /materials supplied by the Contractor under the 'First Contract' when installed and commissioned by the Contractor under this 'Second Contract' shall give satisfactory performance in accordance with the provisions of the Contract.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by for and
on behalf of the Employer

.....
Signature

.....
Title

in the presence of

Signed by for and
on behalf of the Contractor

.....
Signature

.....
Title

in the presence of

(Separate Contract Agreements shall be executed by the Employer and the Contractor in accordance with the Construction of the Contract stipulated at BDS Clause [ITB 30.4]. The forms of Contract i.e., both a & b shall be used).

TERMS AND PROCEDURES OF PAYMENT

In accordance with the provisions of GCC Clause 8 (Terms of Payment), the Employer shall pay the Contractor in the following manner and at the following times, on the basis of the Price Breakdown given in the section on price schedules. Payments will be made in the currencies quoted by the Bidder unless otherwise agreed between the parties. The Contractor may make applications for payment in respect of part deliveries as work proceeds.

1. TERMS OF PAYMENT

In addition to the Conditions stipulated under GCC Clause 8, the following terms & Conditions will apply.

1.1 Supply Portion

- A. Interest Bearing Advance (Optional*): Ten percent (10%) of the Ex-works price component of Main Equipment/Materials (including Mandatory Spares) shall be paid as an interest bearing initial advance after signing the Contract Agreement and on submission of (a) Proforma invoice(s), (b) Advance Bank Guarantee for 110% (one hundred ten percent) of the amount of Advance, in line with GCC Clause 9.2, (c) Performance Securities in line with GCC Clause 9.3 and (d) Detailed PERT Network/Bar chart and its approval by the Employer. Provided further that the Proforma Invoice(s) for advance payment along with all supporting documents is submitted by the Contractor to the Employer within 3 months from the date of Notification of Award. In case the Contractor does not submit the requisite documents including applicable Bank Guarantee(s)/Security(ies) within the aforesaid period, the advance shall not be payable. The Contractor shall, within 7 days from the date of receipt of Advance, furnish an Advance Receipt Voucher to the Employer, as prescribed under the GST Law.

Note: * This payment is an optional payment. The Contractor has the option of taking the interest bearing initial advance or otherwise.

Interest rate applicable on advance payment to the Contractor shall be at the rate equal to one year MCLR rate [One year Tenor rate p.a.] published by State Bank of India prevailing as on the date of drawal of advance. The said interest rate shall remain fixed and shall be applicable till the advance amount is fully repaid. The interest will be charged considering proportionate adjustment of advance against progressive payment as per 1.1(C) below. The interest shall be calculated on the daily progressive balances outstanding as on the date of recovery/adjustment. It is the Employer's understanding that as per extant provisions, GST is not payable on interest paid on the amount of Advance. The Contractor is, however, advised to check the position from their own sources. If payable, the same shall be to the Contractor's account and Employer shall not reimburse any GST on this account.

Further, the Contractor shall submit the certificate of Tax Deduction at Source (TDS) on interest within 3 months from the end of the quarter in which adjustment of advance has been made for claiming refund from Employer. No claim for refund will be entertained after end of the aforesaid period of 3 months. Further, while submitting the TDS Certificate the details of Contract No, Project, Region, Quarter etc to which the TDS certificate pertains, shall also be submitted tallying the amount with the TDS Certificate.

In case, the Contractor opts not to take interest bearing advance as above, it would be mandatory for him to submit the documents listed at Sl. No. (c), and (d) above within twenty eight (28) days of issuance of NOA.

(The above is to be incorporated in case the Contractor has opted for the interest bearing initial advance, as declared by it in its bid in the relevant Attachment to Bid Form).

B. It would be mandatory for contractor to fulfill the following conditions mentioned at as per terms & conditions of Contract and agreed work schedule:

- a) Approval of all designs, drawings & guaranteed technical particulars as identified in Technical Specifications, Volume-II of the Bidding Documents.
- b) Approval of all quality plans and sub-vendor list.
- c) Approval of type test reports in case type tests are not required to be repeated.

C Progressive Payment[#]

Payment of the Ex-works Price Component of the Contract Price (including mandatory spares) shall be made progressively on certification of the Employer and on the basis of work performed using the following guidelines:

C.1 Seventy five percent (75%)** of the Ex-works price component of Contract price shall be paid as follows:

- a) Software (Substation Automation System (SAS))
 - i) Twenty percent (20%)[#] of the Ex-works price of Software shall be paid on pro-rata basis after successful completion of Factory Tests (FAT) and delivery of software tapes to Employer's respective sites as identified in the Contract software installation, based on certification by the Employer.

In case the contractor opts not to take interest bearing advance or has opted to take interest bearing initial advance but the advance payment has become inadmissible for the reason specified in 1.1 A above then this payment shall be 30% instead of 20%.

- ii) Fifty five percent (55%) of the Ex-works price of Software shall be paid on pro-rata basis after successful completion of Field tests, based on certification by the Employer.

b) Hardware (RTU)

- i) Sixty percent (60%)[^] of the Ex-works price of Hardware (including spares) shall be paid on pro-rata basis on shipment of equipment and on submission of :
- a) Evidence of despatch {Consignment Note (R/R or L/R)}
 - b) Contractor's GST invoice, claim & packing list identifying contents of each shipment.
 - c) Manufacturer's/Contractor's guarantee certificate of quality.
 - d) Insurance Policy/Certificate.
 - e) Material Inspection Clearance Certificate (MICC) for dispatch issued by the Employer's representative.
 - f) Test Certificate.
 - g) The details of items, components, raw materials, services etc. procured/availed from MSEs, if any, for the preceding 6 months, in respect of all the contracts in the respective executing Region of POWERGRID as per format enclosed at Section VI, Forms, Volume-I of the bidding documents.
 - i) **Additional performance securities, if required, as per Technical Specification and GCC Clause 9**
 - j) **Submission of (i) Authorization certificate issued by domestic manufacturer for selling Domestically Manufactured Iron & Steel Products, if applicable; and (ii) Affidavit of Self certification regarding Domestic Value Addition in Iron & Steel Products; in line with GCC Clause 5.7.**
 - k) **Value- addition certificate on half-yearly basis (Sep 30 and Mar 31), duly certified by the Statutory Auditors of the Domestic Manufacturer, that the claims of value-addition made for the product during the preceding 6 months are in accordance with the 'Policy for providing preference to Domestically Manufactured Iron & Steel Products in Government Procurement'.**

[^] *In case the contractor opts not to take interest bearing advance or has opted to take interest bearing initial advance but the advance payment has become inadmissible for the reason specified in 1.1 A above, then this payment shall be 70% instead of 60%.*

- ii) Fifteen (15%) of the Ex-works price of Hardware (including spares) shall be paid on pro-rata basis within 30 days of receipt of equipment at site and on submission of claim and physical verification by the Employer.

****** *In case the contractor opts not to take interest bearing advance or has opted to take interest bearing initial advance but the advance payment has become inadmissible for the reason specified in 1.1 A above, then this payment shall be 85% instead of 75%.*

Percentage of Progressive Payment shall be suitably adjusted in case of unbalanced/ front loaded bid as per the methodology brought-out at sl. No. 2.3 below.

D Final Payment

Balance fifteen percent (15%) of the Ex-works price component of the Main Equipment shall be paid within 30 days of Operational Acceptance (on successful completion of system availability tests) and proof of submission of the required no. of reproducibles, O&M manuals, approved drawings, data sheets, test reports, pamphlets and manual of spares, maintenance & testing equipment etc.

1.2 Type Test Charges

Payment shall be made only for the type tests actually conducted as per the Contract. The charges for type tests shall be paid along with the progressive payment on dispatch for the first consignment of Equipment for which the type test has been conducted and on fulfillment of the following conditions:

- (i) Successful completion of all the type tests as directed by the Employer,
- (ii) Approval of the test results by the Employer
- (iii) Furnishing of GST invoice for the Equipment along with Type Test charges.

1.3 Supply of Services Portion:

Inland Transportation, In-transit insurance, Loading & unloading Charges

Inland transportation and In-transit insurance charges shall be paid to the Contractor on pro-rata basis, as per the unit rates indicated in the Contract Agreement, after receipt of materials/items at site and on presentation of the Bill of supply or any other documents prescribed under GST Law alongwith supporting documents by the Contractor. However, these charges will be subject to a limitation that the aggregate of all invoices does not exceed the total amount indicated in the Contract Agreement. It is the Employer's understanding that as per extant provisions, on the charges for supply of services related to Inland transportation, In-transit insurance, loading and unloading by the Contractor to the Employer, GST is not payable. The Contractor is, however, advised to check the position from their own sources. If payable, the same shall be to the Contractor's account and Employer shall not reimburse any GST on this account.

1.4 Supply of Services Portion:

- (a) Eighty five percent (85%) of the installation charges shall be paid on pro-rata basis after installation at site and on certification by the Employer.

Further, one of the conditions for release of first progressive payment / subsequent payment shall be submission of 'Safety Plan' alongwith all requisite documents in line with GCC clause on Safety Precaution and proforma provided in this Section - Sample Forms and Procedure and approval of the same by the Engineer In-Charge.

- (b) Balance fifteen percent (15%) shall be paid within 30 days of Operational Acceptance alongwith the corresponding final payment for supply portion mentioned at Clause C (a) above.

1.5 Training Charges

Training Charges shall be paid on successful completion of training and on approval of the same by the Employer and on furnishing GST invoice for the Training Charges.

1.6 Maintenance Charges during Defect Liability Period

Maintenance Charges during Defect Liability Period shall be paid at the end of Defect Liability Period on furnishing GST invoice(s) for the Annual Maintenance Charges (AMC) and Performance Security(ies) in line with GCC Clause 9.3 and on certification by the Employer in line with provisions of Technical Specifications.

1.7 AMC Charges after Defect Liability Period

Annual Maintenance Charges subsequent to Defect Liability Period shall be paid quarterly on furnishing GST invoice(s) for the Annual Maintenance Charges by Contractor and on certification by the Employer in line with provisions of Technical Specifications.

1.8 Payment towards Price adjustment (Not Applicable)

Any variation in Contract price due to price adjustment provision of Appendix-2 shall be effected on presentation of debit note/credit note, as prescribed under the GST law, supported by calculations as per formulae specified therein along with documentary evidence for different indices applicable for Price Adjustment.

1.8.1 Any increase in Contract price due to price adjustment provision shall be payable as follows:

Supply of Goods Portion:

90% (ninety percent) of the price adjustment amount for the respective shipment shall be paid on receipt of said shipment at site and issuance of Debit Note, as prescribed under the GST law, by the Contractor. Balance 10% (ten percent) of the price adjustment amount shall be paid alongwith the final payment.

Any interest on GST payable due to increase in Contract price due to price adjustment shall be to the Contractor's account and Employer shall not reimburse any amount on this account.

Supply of Services Portion:

90% (ninety percent) of the price adjustment amount for the respective billing period shall be paid after certification by Employer's representative for quantum of work done in the said billing period and issuance of Debit Note, as prescribed under the GST law, by the Contractor. Balance 10% (ten percent) of the price adjustment amount shall be paid alongwith the final payment.

Any interest on GST payable due to increase in Contract price due to price adjustment shall be to the Contractor's account and Employer shall not reimburse any amount on this account.

1.8.2 For any reduction in Contract Price due to price adjustment provisions the Contractor shall issue 'Credit note', as prescribed under the GST law. Further, the reduction in Contract Price shall be effected by recovering 100% of the reduction amount along with applicable GST, if any charged earlier, from Contractor's invoices falling immediately due for payment or any other payments.

1.8.3 In case negative PV invoice is submitted by the contractor after the specified timeline as per the contract, interest shall be charged on said amount less provisional amount withheld on this account, if any, for the period elapsed beyond the specified timeline and date of submission of PV bill by the contractor. Rate of Interest shall be equal to one year MCLR rate [One Year Tenor rate p.a] published by State Bank of India as applicable on the last date of specified timeline. Further, the amount of interest worked out on negative PV shall be recovered from Contractor's invoices falling immediately due for payment or any other payments under the contract.

1.9 Payment towards Taxes and Duties

Taxes and duties applicable as per Indian Tax laws, concerning Supply of Goods and Services in respect of transaction between the Employer and the Contractor, shall be reimbursed by the Employer as follows:

- (a) GST, if applicable, on Advance payment shall be reimbursed along with the Advance payment.
- (b) In case of Ex-works supply of goods, GST shall be reimbursed along with progressive payment on dispatch.
- (c) In case of Installation, the remaining GST(GST charged on invoice less GST on advance) shall be reimbursed along with Progressive payment on completion of Erection activity.

- (d) GST on type test shall be reimbursed after successful completion of the Type test and along with the progressive payment on dispatch for the first consignment of Equipment for which the type test has been conducted. **(NOT APPLICABLE)**.
- (e) GST on Training charges shall be reimbursed on successful completion of Training.
- (f) GST, if any, on Annual Maintenance Charges shall be reimbursed on successful completion of Annual Maintenance.
- (g) 100% GST reimbursable on account of increase in Contract price due to price adjustment shall be reimbursed along with the 90% payment of the Price adjustment amount **(NOT APPLICABLE)**.

All GST payment except GST applicable on Advance shall be against GST invoices/ debit notes raised by the Contractor as specified under the GST Act and related Rules, Notifications, etc as notified by the Government in this regard. In the event that the Contractor fails to provide the invoice/ debit note in the form and manner prescribed under the GST Act and Rules, the Employer shall not be liable to make any payment against such invoice/debit note. Reimbursement of GST payment against Advance payment shall be against proforma invoice(s). Further, the Contractor shall, within 7 days from the date of receipt of Advance, furnish an Advance Receipt Voucher to the Employer, as prescribed under the GST Law. Payment towards taxes & duties shall be released by the Employer directly to the Contractor.

2. PAYMENT PROCEDURES

2.1 Method of Payment

The Employer shall make payments promptly within thirty (30) days of submission of an invoice/claim by the Contractor, complete in all respects and supported by the requisite documents and fulfillment of stipulated conditions, if any. All the payment shall be released to the Contractor directly.

All payments to be made directly to the Contractor shall be made by the Employer through electronic payment mechanism (e-payment) for which necessary details shall be tied up during execution of the Contract. However, a request for payment to be released through cheque shall be considered on case to case basis and merit of the same.

Note: Pro-rata shall refer to functionally complete part(s) of the facilities, for which unit rates are identified in the contract.

2.1.1 POWERGRID is registered on TReDS (Trade Receivables Discounting System) platforms namely i.e. RXIL (Receivable Exchange of India Limited), M1-xchange (Mynd Solutions Private Limited) and Invoicemart (A.TReDS Limited) and the

facility of the same may be availed by Micro, Small and Medium Enterprises (MSMEs) for payment.

2.2 Bill Tracking System

Prior to submission of bills in physical form, the Contractor shall submit its bills using POWERGRID's Vendor Bill Tracking System as per procedure detailed herein below. Further, the Contractor may also track the status of its bills using POWERGRID's 'On-line Vendor Bill Tracking System'. To use this system the Contractor is required to get itself registered once online at POWERGRID's ERP Portal with the link URL (<https://etender.powergrid.in>). Once registered, the Contractor may track status of bills submitted, passed and paid by POWERGRID's Corporate Centre and Regional Office(s) under this Contract and other Contracts awarded on it by POWERGRID by following the method detailed herein below:

- a) Once registered, the Contractor can log-in to POWERGRID's Vendor Bill Tracking System (BTS) with Vendor Log-In ID and Password.
- b) After login as at (a) above, Contractor is required to make the entry on POWERGRID's ERP Portal under the tab "Submit New Invoice" and shall fill all details along with the MSE status. Upon submission, a 16 digit unique BTS number will be generated and the Contractor will receive an automated e-mail forwarding the unique BTS number.
- c) The physical bills alongwith printed copy of e-mail received from BTS (unique BTS number) shall be submitted by the Contractor.
- d) On receipt of physical bill, concerned POWERGRID's official shall online acknowledge the receipt of bill. This action will trigger an automated mail to the Contractor intimating that the physical copy of the bill has been received and is under verification / processing. However, on receipt of incomplete bill and/or non-receipt of physical bill by POWERGRID official, the incomplete bills/digital entry in BTS (as the case may be) shall be returned to the Contractor by POWERGRID, which can be viewed under the tab "Invoice Returned".
- e) The day the payment is made, a mail stating the "Bill number, net payment amount and details of the bank from where the payment has been made" will be sent to the Contractor.
- f) The status of Bill submitted by the Contractor can be checked through the BTS number under tab "Invoice Submitted".

2.3 PAYMENT PROCEDURES IN CASE OF UNBALANCED/ FRONT LOADED BID

- a. A bid shall be considered front loaded or unbalanced, if the percentage of Services component (*Installation, civil works, F&I and Training/AMC, if any*) to Total Contract

Price (*Supply component including Offshore + Services component including AMC Contracts*) quoted by the bidder is less than **27%** .

- b. In the event of award on the bidder who have submitted unbalanced/front loaded bid, the percentage of Progressive payment against Supply of Goods portion (*refer sl. No. 1.1 above*) shall be deferred by the percentage by which the percentage of the Services price components in the bid less than the percentage specified at 2.3 a above in the bidding documents. No interest shall be payable on the deferred amount. The aforesaid deferred amount shall be paid on pro-rata basis upon completion of installation of the respective item and its certification by the Project Manager
No interest shall be payable on the deferred amount.

Price Variation and Quantity variation shall continue to be governed by the unit price quoted by the bidder.

****End of Appendix-1****

PRICE ADJUSTMENT

The Contract price shall remain FIRM and FIXED and shall not be subject to Price adjustment for the entire duration of the Contract.

****End of Appendix-2****

INSURANCE REQUIREMENTS

A) Insurances to be taken out by the Contractor

In accordance with the provisions of GCC Clause 30, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, such approval not to be unreasonably withheld. The inability of the insurers to provide insurance cover in the sums and with the deductibles and other conditions as set forth below, shall not absolve the Contractor of his risks and liabilities under the provisions of GCC Clause 30. However, in such a case the Contractor shall be required to furnish to the Employer documentary evidence from the insurer in support of the insurer's inability as aforesaid.

(a) Marine Cargo Policy/Transit Insurance Policy:

(I)(i) Marine Cargo policy for imported equipment

The Contractor shall take the Marine Cargo Policy for Plant and Equipment including mandatory Spares to be supplied from abroad wherein export/import including inland transit is involved for the movement of the Plant and Equipment including mandatory Spares. The policy shall cover movement of Plant and Equipment including mandatory Spares from the manufacturer's works to the project's warehouse at final destination site. The policy shall cover all risk for loss or damage that may occur during transit of Plant and Equipment including mandatory Spares from the Contractor/sub-Contractor's works or stores until arrival at project's warehouse/ store at final destination. Institute Cargo Clause (ICC) 'A' along with war & Strike Riots & Civil Commotion (SRCC) cover shall be taken.

(I)(ii) Transit Insurance Policy for indigenous equipment

Similarly, Transit Insurance Policy shall be taken wherein only inland transit is involved for the movement of Plant and Equipment including mandatory Spares supplied from within India. The policy shall cover movement of Plant and Equipment including mandatory Spares from the manufacturer's works to the project's warehouse at final destination site. Inland Transit Clause (ITC) 'A' along with Strike Riots & Civil Commotion (SRCC) extension cover shall be taken.

Amount	Deductible Limits	Parties insured	From	To
120% of CIP Entry Border Point Price /CIF Indian Port of Entry Price of all the Plant and Equipment including mandatory Spares to be supplied from abroad plus customs duties (including BCD, GST, Cess etc.) on merit rate and 120% of Ex-work Price of all the Plant and Equipment including mandatory Spares to be supplied from within India plus GST, if additionally payable.	Nil	Contractor & Employer	Mfrs ware-house	Project's ware-house store at final destination

(II) If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(III) The Contractor shall take the policy in the joint names of Employer and the Contractor. The policy shall indicate the Employer as the beneficiary. However, if the Contractor is having an open policy for its line of business, it should obtain an endorsement of the open cover policy from the insurance company indicating that the dispatches against this Contract are duly covered under its open policy and include the name of the Employer as jointly Insured in the endorsements to the open policy.

(b) Erection All Risk Policy/Contractor All Risk Policy:

(I) The policy should cover all physical loss or damage to the facility at site during storage, erection and commissioning covering all the perils as provided in the policy as a basic cover and the add on covers as mentioned at Sl. No. (III) below.

Amount	Deductible limits	Parties insured	From	To
105% of CIP Entry Border Point Price /CIF Indian Port of Entry Price of all the Plant and Equipment including mandatory Spares to be supplied from abroad plus customs duties (including BCD, GST, Cess etc.) on merit rate and 105% of Ex-work Price of all the Plant and Equipment including mandatory Spares to be supplied from within India plus GST, if additionally payable. and 100% of erection price component	Minimum deductible as per Tariff Advisory Committee guidelines*	Contractor & Employer	Receipt at site of first lot of the Plant and Equipment including mandatory Spares	Up to Operational Acceptance

* *The deductibles as aforesaid shall not absolve the Contractor of his risks and liabilities under the contract provisions for insurance and in case of a claim under the policy, deductibles, if any, shall be to the Contractor's account*

- (II) The Contractor shall take the policy in the joint name of Employer and the Contractor. All these policies shall indicate Employer as the beneficiary. The policy shall be kept valid till the date of the Operational Acceptance of the project and the period of the coverage shall be determined with the approval of the Employer.

If the work is completed earlier than the period of policy considered, the Contractor shall obtain the refund as per provisions of the policy and pass on the benefit to Employer. In case no refund is payable by the insurance company then the certificate to that effect shall be submitted to Employer at the completion of the project.

- (III) The following add-on covers shall also be taken by the Contractor:
- Earthquake
 - Terrorism
 - Escalation cost (approximately @10% of sum insured on annual basis)
 - Extended Maintenance cover for Defect Liability Period
 - Design Defect

- vi) Other add-on covers viz., 50-50 clause, 72 hours clause, loss minimization clause, waiver of subrogation clause (for projects of more than Rs.100 crores, cover for offsite storage/fabrication (over Rs.100 crores).

(IV) *Third Party Liability cover with cross Liability within Geographical limits of India as on ADD-on cover to the basic EAR cover:*

The third party liability add-on cover shall cover bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities which have been accepted by the Employer) occurring in connection with supply and installation of the Facilities.

Amount	Deductible limits	Parties insured	From	To
- For projects upto Rs. 100 crores, the third party liability limit shall be 10% of the project value for single occurrence/ multiple occurrences in aggregate during the entire policy period. - For projects from Rs. 100 crores to Rs. 500 crores, the third party liability limit shall be Rs. 10 crores for single occurrence/multiple occurrences in aggregate during entire policy period. For projects of more than Rs.500 crores, the third party liability limit shall be Rs. 25 crores for single occurrence/ multiple occurrences in aggregate during entire policy period.	Minimum deductible as per Tariff Advisory Committee guidelines*	Contractor/ Sub-contractor	Receipt at site	Upto Defect Liability Period.

* *The deductibles as aforesaid shall not absolve the Contractor of his risks and liabilities under the contract provisions for insurance and in*

case of a claim under the policy, deductibles, if any, shall be to the Contractor's account

- (V) As per GCC Clause 30.8, the cost of insurance premium is to be reimbursed to the Contractor for Owner Supplied Materials (OSM) for which the insurer is to be finalized by the Contractor as detailed therein. Alternatively, the Contractor may take a single policy covering the entire cost of the project including the cost of OSM. For this purpose, the Contractor shall submit documentary evidence for the premium paid for the entire project to the Employer and Employer shall reimburse to the Contractor the proportion of premium equal to value of OSM to total sum insured.

If during the execution of Contract, the Employer requests the Contractor to take any other add-on cover(s)/ supplementary cover(s) in aforesaid insurance, in such a case, the Contractor shall promptly take such add-on cover(s)/ supplementary cover(s) and the charges towards such premium for such add-on cover(s)/ supplementary cover(s) shall be reimbursed to the Contractor on submission documentary evidence of payment to the Insurance company. Therefore, charges towards premium for such add-on cover(s)/ supplementary cover(s) are not included in the Contract Price.

(c) Automobile Liability Insurance

The Contractor shall ensure that all the vehicles deployed by the Contractor or its Subcontractors (whether or not owned by them) in connection with the supply and installation of the Facilities in the project are duly insured as per RTA act. Further the Contractor or its Subcontractors may also take comprehensive policy(own damage plus third party liability) of each individual vehicles deployed in the project on their own discretion in their own name to protect their own interest.

(d) Workmen Compensation Policy:

- (I) Workmen Compensation Policy shall be taken by the Contractor in accordance with the statutory requirement applicable in India. The Contractor shall ensure that all the workmen employed by the Contractor or its Subcontractors for the project are adequately covered under the policy.
- (II) The policy may either be project specific covering all men of the Contractor and its Subcontractors. The policy shall be kept valid till the date of Operational Acceptance of the project.

Alternatively, if the Contractor has an existing 'Workmen Compensation Policy' for all its employees including that of the Subcontractor(s), the Contractor must include the interest of the Employer for this specific Project in its existing 'Workmen Compensation Policy'.

- (III) Without relieving the Contractor of its obligations and responsibilities under this Contract, before commencing work the Contractor shall insure against liability for death of or injury to persons employed by the Contractor including liability by statute and at common law. The insurance cover shall be maintained until all work including remedial work is completed including the Defect Liability Period. The insurance shall be extended to indemnify the Principal for the Principal's statutory liability to persons employed by the Contractor.

The Contractor shall also ensure that each of its Subcontractors shall effect and maintain insurance on the same basis as the 'Workmen Compensation Policy' effected by the Contractor.

(e) Contractor's Plant and Machinery (CPM) Insurance

The Employer (including without limitation any consultant, servant, agent or employee of the Employer) shall not in any circumstances be liable to the Contractor for any loss of or damage to any of the Contractor's Equipment or for any losses, liabilities, costs, claims, actions or demands which the Contractor may incur or which may be made against it as a result of or in connection with any such loss or damage.

The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1, except for the Third Party Liability, Workmen Compensation Policy Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Sub-Clause 30.1 except for the Cargo Insurance During Transport, Workmen Compensation Policy Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.

B) Insurances to be taken out by the Employer

The Employer shall at its expense take out and maintain in effect during the performance of the Contract the following insurances.

Amount	Deductible limits	Parties Insured	From	To
_____ NIL _____				

****End of Appendix-3****

TIME SCHEDULE

1. The Project Completion Schedule shall be as follows:

Description	Duration in Months from the date of Notification of Award
Taking Over by the Employer upon successful Completion of :	
Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR). Spec. No.: CC/NTW-MISC/DOM/A06/23/11830	20 months (Twenty Months)

- 1.1 The activity(ies) under the Contractor's programme for Project Completion shall be in the form of a master network (MNW) and shall identify the various activities like design, engineering, manufacturing, supply, installation, factory testing, transportation to site, site testing and commissioning, trial operation and Taking Over etc. of the Facilities or specific part thereof (where specific parts are specified in SCC). The network shall conform to the above Project Completion Schedule.

This master network will be discussed and agreed before Award in line with above, engineering drawing and data submission schedule shall also be discussed and finalised before Award. Liquidated damages for delay in successful completion of the Facilities or specific part thereof (where specific parts are specified in SCC) and Operational Acceptance at rates specified in Clause 21 of GCC shall be applicable beyond the date specified above.

- 1.2 The Employer reserves the right to request minor changes in the work schedule at the time of Award of Contract to the successful Bidder.
- 1.3 The successful Bidder shall be required to prepare detailed Network(s) and project implementation plans & programmes and finalise the same with the Employer as per the requirement specified in Technical Specifications, which shall form a part of the Contract.
- 1.4 **Time for Completion is the essence of Contract.**

****End of Appendix-4****

LIST OF APPROVED SUBCONTRACTORS

Prior to award of Contract, the following details shall be completed indicating those sub-contractors proposed by the Bidder by Attachment to its bid that are approved by the Employer for engagement by the Contractor during the performance of the contract.

The following Subcontractors are approved for carrying out the item of the facilities indicated. Where more than one Subcontractor is listed, the Contractor is free to choose between them, but it must notify the Employer of its choice in good time prior to appointing any selected Subcontractor. In accordance with GCC Sub-Clause 15.1, the Contractor is free to submit proposals for Subcontractors for additional items from time to time. No Subcontracts shall be placed with any such Subcontractors for additional items until the Subcontractors have been approved in writing by the Employer and their names have been added to this list of Approved Subcontractors.

Item of Facilities	Approved Subcontractors	Nationality

Further, erection portion of the contract shall not be subcontracted without the prior approval of the Employer. However, such approval shall not be necessary for engaging labour.

****End of Appendix-5****

SCOPE OF WORKS AND SUPPLY BY THE EMPLOYER

The following personnel, facilities, works and supplies will be provided/supplied by the Employer, and the provisions of GCC 6, 16, 17 and 20 as well as Employer responsibilities stated in technical specifications shall apply as appropriate.

All personnel, facilities, works and supplies will be provided by the Employer in good time so as not to delay the performance of the Contractor in accordance with the approved Time Schedule and Program of Performance pursuant to GCC Sub-Clause 14.2.

Unless otherwise indicated, all personnel, facilities, works and supplies will be provided free of charge to the Contractor.

Personnel Charge to Contractor – None

-----NIL-----

Facilities Charge to Contractor - None except as noted

Electricity and Water Charge to Contractor - as noted

The Contractor shall be entitled to use for the purposes of the facilities such supplies of electricity and water as may be available on the Site and shall provide any apparatus necessary for such use. The Contractor shall pay the Employer at the applicable tariff plus Employer's overheads, if any, for such use. Where such supplies are not available, the Contractor shall make his own arrangement for provision of any supplies he may require.

Works Charge to Contractor - None

-----NIL-----

Supplies Charge to Contractor - None

-----NIL-----

****End of Appendix-6****

LIST OF DOCUMENTS FOR APPROVAL OR REVIEW

Pursuant to GCC Sub-Clause 16.3.1, the Contractor shall prepare, or cause its Subcontractor to prepare, and present to the Project Manager in accordance with the requirements of GCC Sub-Clause 14.2 (Program of Performance), the following documents for:

A. Approval

- 1.
- 2.
- 3.

B. Review

- 1.
- 2.
- 3.

Note :

Bidder shall furnish the exhaustive list, which shall be discussed and finalised for incorporation into the Contract Agreement.

****End of Appendix-7****

GUARANTEES, LIQUIDATED DAMAGES FOR NON PERFORMANCE

NOT APPLICABLE

****End of Appendix-8****

6. PERFORMANCE SECURITY FORM

(For the purpose of verification/confirmation of this Bank Guarantee by the Employer, the Bank shall indicate 2 official email ids of the authorized signatories from Issuing Branch and also of the designated higher office (Corporate Office, Zonal Office etc) in the covering letter of the Bank forwarding the Bank Guarantee.)

Bank Guarantee No.

Date.....

NOA/Contract No.....

..... [Name of Contract].....

To: [Name and address of the Employer]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract")

Signed on..... *(insert date of the notification of award)....between you and M/s*
..... (Name of Contractor),

(OR)

vide notification of award issued on.....*(insert date of the notification of award).....*
by you to M/s *(Name of Contractor),*

having its Principal place of business at *(Address of Contractor)*
and Registered Office at *(Registered address of Contractor)*
..... *("the Contractor") concerning*
..... *(Indicate brief scope of work)* for the complete execution of
the *(insert name of Package alongwith name of the Project)..... [Applicable for Bank*
Guarantees issued by Contractor/Associate for those Contracts awarded to them]

(OR)

We refer to the Contract ("the Contract")

Signed on..... *(insert date of the notification of award)....between you and M/s*
..... (Name of Contractor),

(OR)

vide notification of award issued on.....*(insert date of the notification of award).....*
by you to M/s *(Name of Contractor),*

having its Principal place of business at(*Address of Contractor*)
and Registered Office at(*Registered address of Contractor*)
..... ("the Contractor") and the Contract ("the
Contract") signed on(*insert date of the Contract*)..... between you and M/s
(*Name of Associate*), having its Principal place of business at(*Address of*
Associate) and Registered Office at(*Registered address of Associate*)
....., the Associate of the Contractor for
executing the Facilities concerning (*Indicate brief scope of work*)
..... for the complete execution of the (*insert name of Package alongwith*
name of the Project)..... [*Applicable for Bank Guarantees to be issued by Contractor against those*
Contracts awarded to their Associate]

By this letter we, the undersigned, ...(*insert name & address of the issuing bank*), a
Bank (which expression shall include its successors, administrators, executors and assigns)
organized under the laws of and having its Registered/Head Office at
.....(*insert address of registered office of the bank*)..... do hereby irrevocably guarantee
payment to you up to i.e., **ten percent (10%)** of the Contract Price
until ninety (90) days beyond the Defect Liability Period i.e., upto and inclusive of
..... (*dd/mm/yy*).

We undertake to make payment under this Letter of Guarantee upon receipt by us of your
first written demand signed by your duly authorized officer declaring the Contractor to be
in default under the Contract and without cavil or argument any sum or sums within the
above named limits, without your need to prove or show grounds or reasons for your
demand and without the right of the Contractor to dispute or question such demand.

Our liability under this Letter of Guarantee shall be to pay to you whichever is the lesser of
the sum so requested or the amount then guaranteed hereunder in respect of any demand
duly made hereunder prior to expiry of the Letter of Guarantee, without being entitled to
inquire whether or not this payment is lawfully demanded.

This letter of Guarantee shall remain in full force and shall be valid from the date of issue
until ninety (90) days beyond the Defect Liability Period of the Facilities i.e. upto and
inclusive of (*dd/mm/yy*) and shall be extended from time to time for such period
(not exceeding one year), as may be desired by M/s. on whose behalf
this Letter of Guarantee has been given.

Except for the documents herein specified, no other documents or other action shall be
required, notwithstanding any applicable law or regulation.

Our liability under this Letter of Guarantee shall become null and void immediately upon
its expiry, whether it is returned or not, and no claim may be made hereunder after such
expiry or after the aggregate of the sums paid by us to you shall equal the sums guaranteed
hereunder, whichever is the earlier.

All notices to be given under shall be given by registered (airmail) posts to the addressee at
the address herein set out or as otherwise advised by and between the parties hereto.

We hereby agree that any part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Contractor, and this security may be exchanged or surrendered without in any way impairing or affecting our liabilities hereunder without notices to us and without the necessity for any additional endorsement, consent or guarantee by us, provided, however, that the sum guaranteed shall not be increased or decreased.

No action, event or condition which by any applicable law should operate to discharge us from liability hereunder shall have any effect and we hereby waive any right we may have to apply such law so that in all respects our liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

“Notwithstanding anything contained herein:

1. *Our liability under this Bank Guarantee shall not exceed _____ (value in figures) _____ [_____ (value in words) _____].*
2. *This Bank Guarantee shall be valid upto _____ (validity date) _____.*
3. *We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before _____ (validity date) _____.”*

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature _____

Name _____

Designation _____

POA Number _____

Contact Number(s):

Tel. _____ Mobile _____

Fax Number _____

email _____

Common Seal of the Bank _____

Witness:

Signature _____

Name _____

Address _____

Contact Number(s):

Tel. _____ Mobile _____

email _____

Note :

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.
3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph regarding applicability of ICC Publication No. 758, the following may be added at the end of the proforma of the Bank Guarantee *[i.e. end paragraph of the Bank Guarantee preceding the signatures of the issuing authority(ies) of the Bank Guarantee]*:

"This Guarantee is subject to Uniform Rules for Demand Guarantee, ICC Publication No. 758 except that Article 15(a) is hereby excluded."
4. At the time of issuance of the Bank Guarantee (including its extensions) through SFMS facility, the issuing bank will input the IFSC code of Beneficiary Bank as mentioned at GCC clause 9.4 in SCC in their Trade Finance Portal.

Additional paragraph regarding issuance of the Bank Guarantee through SFMS Platform (if applicable), the following should be added at the end of the proforma of the Bank Guarantee *[i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee]*:

"This Guarantee has been issued using SFMS Platform and the requisite communication in this regard has been forwarded to the Beneficiary Bank."

6_A.PERFORMANCE SECURITY FORM

(TO BE SUBMITTED BY THE CONTRACTOR OPTING FOR SUBMISSION OF PERFORMANCE SECURITY WITH INITIAL VALIDITY OF 5 YEARS IN ACCORDANCE WITH CLAUSE GCC 9.3.1.1)

(For the purpose of verification/confirmation of this Bank Guarantee by the Employer, the Bank shall indicate 2 official email ids of the authorized signatories from Issuing Branch and also of the designated higher office (Corporate Office, Zonal Office etc)in the covering letter of the Bank forwarding the Bank Guarantee.)

Bank Guarantee No.

Date.....

NOA/Contract No.....

.....[Name of Contract].....

To: [Name and address of the Employer]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract")

signed on(insert date of the Contract)..... between you and M/s (Name of Contractor),

(or)

vide notification of award issued on(insert date of the notification of award)..... by you to M/s (Name of Contractor)

having its Principal place of business at(Address of Contractor)
and Registered Office at(Registered address of Contractor)
..... ("the Contractor") concerning
..... (Indicate brief scope of work) for the complete execution of
the (insert name of Package alongwith name of the Project)..... [Applicable for Bank
Guarantees issued by Contractor/Associate for those Contracts awarded to them]

Or

We refer to the Contract

signed on(insert date of the Contract)..... between you and M/s (Name of Contractor),

(or)

vide notification of award issued on(insert date of the notification of award)..... by you to M/s (Name of Contractor)

having its Principal place of business at(Address of Contractor) and Registered Office at(Registered address of Contractor) ("the Contractor") and the Contract ("the Contract") signed on(insert date of the Contract)..... between you and M/s (Name of Associate), having its Principal place of business at(Address of Associate) and Registered Office at(Registered address of Associate), the Associate of the Contractor for executing the Facilities concerning (Indicate brief scope of work) for the complete execution of the (insert name of Package alongwith name of the Project)..... [Applicable for Bank Guarantees to be issued by Contractor against those Contracts awarded to their Associate]

By this letter we, the undersigned, ...(insert name & address of the issuing bank), a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of and having its Registered/Head Office at(insert address of registered office of the bank)..... do hereby irrevocably guarantee payment to you up to i.e., ten percent (10%) of the Contract Price until 60 months i.e., upto and inclusive of (dd/mm/yy).

We undertake to make payment under this Letter of Guarantee upon receipt by us of your first written demand signed by your duly authorized officer declaring the Contractor to be in default under the Contract and without cavil or argument any sum or sums within the above named limits, without your need to prove or show grounds or reasons for your demand and without the right of the Contractor to dispute or question such demand.

Our liability under this Letter of Guarantee shall be to pay to you whichever is the lesser of the sum so requested or the amount then guaranteed hereunder in respect of any demand duly made hereunder prior to expiry of the Letter of Guarantee, without being entitled to inquire whether or not this payment is lawfully demanded.

This letter of Guarantee shall remain in full force and shall be valid from the date of issue until 60 months i.e. upto and inclusive of (dd/mm/yy) and shall be extended from time to time for such period, as may be desired by M/s. on whose behalf this Letter of Guarantee has been given.

Except for the documents herein specified, no other documents or other action shall be required, notwithstanding any applicable law or regulation.

Our liability under this Letter of Guarantee shall become null and void immediately upon its expiry, whether it is returned or not, and no claim may be made hereunder after such expiry or after the aggregate of the sums paid by us to you shall equal the sums guaranteed hereunder, whichever is the earlier.

All notices to be given under shall be given by registered (airmail) posts to the addressee at the address herein set out or as otherwise advised by and between the parties hereto.

We hereby agree that any part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Contractor, and this security may be exchanged or surrendered without in any way impairing or affecting our liabilities hereunder without notices to us and without the necessity for any additional endorsement, consent or guarantee by us, provided, however, that the sum guaranteed shall not be increased or decreased.

No action, event or condition which by any applicable law should operate to discharge us from liability hereunder shall have any effect and we hereby waive any right we may have to apply such law so that in all respects our liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed _____ (*value in figures*) _____ [*value in words*] _____].
2. This Bank Guarantee shall be valid upto _____ (*validity date*) _____.
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before _____ (*validity date*) _____."

For and on behalf of the Bank

[*Signature of the authorised signatory(ies)*]

Signature _____

Name _____

Designation _____

POA Number _____

Contact Number(s): Tel. _____ Mobile _____

Fax Number _____

email _____

Common Seal of the Bank _____

Witness:

Signature_____

Name_____

Address_____

Contact Number(s): Tel._____ Mobile_____

email _____

Note :

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.
3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph regarding applicability of ICC publication No: 758, the following may be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:
"This Guarantee is subject to Uniform Rules for Demand Guarantee, ICC publication No. 758 except that article 15(a) is hereby excluded."
4. At the time of issuance of the Bank Guarantee (including its extensions) through SFMS facility, the issuing bank will input the IFSC code of Beneficiary Bank as mentioned at GCC clause 9.4 in SCC in their Trade Finance Portal.

Additional paragraph regarding issuance of the Bank Guarantee through SFMS Platform (if applicable), the following should be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:

"This Guarantee has been issued using SFMS Platform and the requisite communication in this regard has been forwarded to the Beneficiary Bank."

7. BANK GUARANTEE FORM FOR ADVANCE PAYMENT

(For the purpose of verification/confirmation of this Bank Guarantee by the Employer, the Bank shall indicate 2 official email ids of the authorized signatories from Issuing Branch and also of the designated higher office (Corporate Office, Zonal Office etc) in the covering letter of the Bank forwarding the Bank Guarantee.)

Bank Guarantee No.

Date.....

NOA/Contract No.....

.....[Name of Contract].....

To: [Name and address of the Employer]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract")

signed on(insert date of the Contract).... between you and M/s (Name of Contractor),

(or)

vide notification of award issued on (insert date of the notification of award)....by you to M/s (Name of Contractor),

having its Principal place of business at(Address of Contractor)
and Registered Office at(Registered address of Contractor)
..... ("the Contractor") concerning
..... (Indicate brief scope of work) for the complete execution of
the (insert name of Package alongwith name of the Project).....

Whereas, in accordance with the terms of the said Contract, the Employer has agreed to pay or cause to be paid to the Contractor an interest bearing Advance Payment against furnishing of an irrevocable bank guarantee for an amount of(Amount in figures and words) which is equal to **[[110% (one hundred ten percent) of the amount of Advance] Plus [amount of GST reimbursable on Advance as per the Proforma invoice, if applicable]]**

By this letter we, the undersigned, ...(insert name & address of the issuing bank), a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of and having its Registered/Head Office at(insert address of registered office of the bank)..... do hereby irrevocably guarantee repayment of the said amounts upon the first demand of the Employer without cavil or

argument in the event that the Contractor fails to commence or fulfill its obligations under the terms of the said Contract, and in the event of such failure, refuses to repay all or part (as the case may be) of the said advance payment to the Employer.

Provided always that the Bank's obligation shall be limited to the amount of this Bank guarantee or an amount equal to the outstanding balance of the Advance Payment and the accrued interest on the Advance Payment, taking into account such amounts, which have been repaid by the Contractor from time to time in accordance with the terms of payment of the said Contract, as certified by you.

This Guarantee shall remain in full force from the date upon which the said advance payment is received by the Contractor upto ninety (90) days beyond the date on which the entire advance so advanced alongwith the interest if any due thereon has been fully adjusted in terms of the Contract i.e., upto of ninety (90) days beyond the date of Completion of the Facilities under the Contract. This Guarantee may be extended from time to time, as may be desired by M/s. on whose behalf this Guarantee has been issued.

Any claims to be made under this Guarantee must be received by the Bank during its period of validity, i.e. upto ninety (90) days beyond the date of Completion of the Facilities by the Employer i.e. upto and inclusive of (dd/mm/yy).

"Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed _____ (value in figures) [_____ (value in words) _____].
2. This Bank Guarantee shall be valid upto _____ (validity date) _____.
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before _____ (validity date) _____."

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature _____

Name _____

Designation _____

POA Number _____

Contact Number(s): Tel. _____ Mobile _____

Fax Number _____

email _____

Common Seal of the Bank _____

Witness:

Signature _____

Name _____

Address _____

Contact Number(s): Tel. _____ Mobile _____

email _____

Note :

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.
3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph regarding applicability of ICC publication No. 758, the following may be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:

"This Guarantee is subject to Uniform Rules for Demand Guarantee, ICC publication No. 758 except that article 15(a) is hereby excluded."

4. At the time of issuance of the Bank Guarantee (including its extensions) through SFMS facility, the issuing bank will input the IFSC code of Beneficiary Bank as mentioned at GCC clause 9.4 in SCC in their Trade Finance Portal.

Additional paragraph regarding issuance of the Bank Guarantee through SFMS Platform (if applicable), the following should be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:

"This Guarantee has been issued using SFMS Platform and the requisite communication in this regard has been forwarded to the Beneficiary Bank."

8. FORM OF TAKING OVER CERTIFICATE

Date.....

Name of Contract.....

Contract No.....

To :

(Name and address of the Contractor)

Dear Ladies and/or Gentlemen,

Pursuant to GCC 20 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated relating to the *(insert brief description of the Facilities)*..... we hereby notify you that the following part(s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Employer hereby takes over the said part(s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below :

1. Description of the Facilities or part thereof
.....
2. Date of Completion :.....

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defects Liability Period.

Very truly yours,

Title
(Project Manager)

9. FORM OF INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR THE EQUIPMENT HANDED OVER IN ONE LOT BY(abbreviated name of the Employer)..... FOR PERFORMANCE OF ITS CONTRACT

INDEMNITY BOND

THIS INDEMNITY BOND is made this..... day of 20..... by a Company registered under the Companies Act, 1956/Partnership firm/ proprietary concern having its Registered Office at.....(hereinafter called as 'Contractor' or "Obligor" which expression shall include its successors and permitted assigns) in favour of (insert name of the Employer)....., a Company incorporated under the Companies Act, 1956 having its Registered Office at(insert registered address of the Employer) and its project at (hereinafter called ".....(abbreviated name of the Employer)....." which expression shall include its successors and assigns):

WHEREAS(abbreviated name of the Employer)..... has awarded to the Contractor a Contract for.....vide its Notification of Award/Contract No..... dated..... and its Amendment No. (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which(abbreviated name of the Employer)..... is required to hand over various Equipment to the Contractor for execution of the Contract.

And WHEREAS by virtue of Clause No.....of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of(abbreviated name of the Employer)..... for the Equipment handed over to it by(abbreviated name of the Employer)..... for the purpose of performance of the Contract/Erection portion of the contract (hereinafter called the "Equipment").

AND THEREFORE, This Indemnity Bond witnesseth as follows:

1. That in consideration of various Equipment as mentioned in the Contract, valued at (amount in words.....) handed over to the Contractor for the purpose of performance of the Contract, the Contractor hereby undertakes to indemnify and shall keep(abbreviated name of the Employer)..... indemnified, for the full value of the Equipment. The Contractor hereby acknowledges receipt of the Equipment as per despatch title documents handed over to the Contractor duly endorsed in their favour and detailed in the Schedule appended hereto. It is expressly understood by the Contractor that handing over of the despatch title documents in respect of the said Equipments duly endorsed by(abbreviated name of the Employer)..... in favour of the Contractor shall be construed as handing over of the Equipment purported to be covered by such title documents and the Contractor shall hold such Equipment in trust as a Trustee for and on behalf of(abbreviated name of the Employer).....
2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the Equipment at(abbreviated name of the Employer)..... project Site against all risks whatsoever till the Equipment are duly

used/erected in accordance with the terms of the Contract and the Plant/Package duly erected and commissioned in accordance with the terms of the Contract, is taken over by(*abbreviated name of the Employer*)..... The Contractor undertakes to keep(*abbreviated name of the Employer*)..... harmless against any loss or damage that may be caused to the Equipment.

3. The Contractor undertakes that the Equipment shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the equipment shall be utilised for any other work of purpose whatsoever. it is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal/penal consequences.
4. That(*abbreviated name of the Employer*)..... is and shall remain the exclusive Employer of the Equipment free from all encumbrances, charges or liens of any kind, whatsoever. The equipment shall at all times be open to inspection and checking by the Employee or Employer's Representative in this regard. Further, ...(*abbreviated name of the Employer*)..... shall always be free at all times to take possession of the Equipment in whatever form the equipment may be, if in its opinion, the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of(*abbreviated name of the Employer*)..... to return the equipment without any demur or reservation.
5. That this indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Equipment or the same or any part thereof is misutilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Employer's Representative as to assessment of loss or damage to the Equipment shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Equipment at his own cost and/or shall pay the amount of loss to(*abbreviated name of the Employer*)..... without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to(*abbreviated name of the Employer*)..... against the Contractor under the Contract and under this Indemnity Bond.
6. NOW THE CONDITION of this Bond is that if the Contractor shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of(*abbreviated name of the Employer*)....., THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

SCHEDULE

Particulars of the Equipment handed over	Quantity	Particulars of Dispatch title Documents		Value of the Equipment	Signature of the Attorney in token of receipt
		RR/GR No. date of lading	Carrier		

For and on behalf of
M/s.....

WITNESS

1. Signature.....

Signature.....

Name.....

Name.....

Address.....

Address.....

2. Signature.....

Authorised representative

Name.....

(Common Seal)

Address.....

(In case of Company)

Indemnity Bonds are to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a Photostat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.

10. FORM OF INDEMNITY BOND TO BE EXECUTED BY THE CONTRACTOR FOR THE EQUIPMENT HANDED OVER IN INSTALLMENTS BY(abbreviated name of the Employer)..... FOR PERFORMANCE OF ITS CONTRACT

INDEMNITY BOND

THIS INDEMNITY BOND is made this day of 20..... by a Company registered under the Companies Act, 1956/Partnership firm/proprietary concern having its Registered Office at(hereinafter called as 'Contractor' or 'Obligor' which expression shall include its successors and permitted assigns) in favour of(insert name of the Employer)....., a company incorporated under the Companies Act, 1956 having its Registered Office at(insert registered address of the Employer)..... and its project at (hereinafter called ".....(abbreviated name of the Employer)....." which expression shall include its successors and assigns):

WHEREAS(abbreviated name of the Employer)..... has awarded to the Contractor a Contract for vide its Notification of Award/Contract No. dated and Amendment No. (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which(abbreviated name of the Employer)..... is required to handover various Equipment to the Contractor for execution of the Contract.

AND WHEREAS by virtue of Clause No.....of the said Contract, the Contractor is required to execute an Indemnity Bond in favour of(abbreviated name of the Employer)..... for the Equipment handed over to it by(abbreviated name of the Employer)..... for the purpose of performance of the contract/Erection portion of the Contract (hereinafter called the "Equipment".)

NOW THEREFORE, This Indemnity Bond witnesseth as follows:

1. That in consideration of various Equipments as mentioned in the Contract, valued at (amount in words _____) to be handed over to the Contractor in installments from time to time for the purpose of performance of the contract, the Contractor hereby undertakes to indemnify and shall keep(abbreviated name of the Employer)..... indemnified, for the full value of Equipment. The Contractor hereby acknowledges receipt of the initial installment of the equipment per details in the schedule appended hereto. Further, the Contractor agrees to acknowledge receipt of the subsequent installments of the Equipment as required by(abbreviated name of the Employer)..... in the form of Schedules consecutively numbered which shall be attached to this Indemnity bond so as to form integral parts of this Bond. It is expressly understood by the Contractor that handing over the despatch title documents in respect of the said Equipments duly endorsed by(abbreviated name of the Employer)..... in favour of the Contractor shall be construed as handing over the Equipment purported to be covered by such title

documents and the Contractor shall hold such Equipments in trust as a Trustee for and on behalf of(*abbreviated name of the Employer*).....

2. That the Contractor is obliged and shall remain absolutely responsible for the safe transit/protection and custody of the Equipment at(*abbreviated name of the Employer*)..... project Site against all risks whatsoever till the Equipment are duly used/erected in accordance with the terms of the Contract and the Plant/Package duly erected and commissioned in accordance with the terms of the Contract, is taken over by(*abbreviated name of the Employer*)..... The Contractor undertakes to keep(*abbreviated name of the Employer*)..... harmless against any loss or damage that may be caused to the Equipment.
3. The Contractor undertakes that the Equipment shall be used exclusively for the performance/execution of the Contract strictly in accordance with its terms and conditions and no part of the equipment shall be utilised for any other work or purpose whatsoever. It is clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal/penal consequences.
4. That(*abbreviated name of the Employer*)..... is and shall remain the exclusive Employer of the Equipment free from all encumbrances, charges or liens of any kind, whatsoever. The equipment shall at all times be open to inspection and checking by the Employer or Employer's Representative in this regard. Further, ...(*abbreviated name of the Employer*)..... shall always be free at all times to take possession of the Equipment in whatever form the Equipment may be, if in its opinion, the Equipment are likely to be endangered, misutilised or converted to uses other than those specified in the Contract, by any acts of omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of(*abbreviated name of the Employer*)..... to return the equipment without any demur or reservation.
5. That this indemnity Bond is irrevocable. If at any time any loss or damage occurs to the Equipment or the same or any part thereof is misutilised in any manner whatsoever, then the Contractor hereby agrees that the decision of the Employer's Representative as to assessment of loss or damage to the Equipment shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Equipment at its own cost and/or shall pay the amount of loss to(*abbreviated name of the Employer*)..... without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to(*abbreviated name of the Employer*)..... against the Contractor under the Contract and under this Indemnity Bond.
6. NOW THE CONDITION of this Bond is that if the Contractor shall duly and punctually comply with the terms and conditions of this Bond to the satisfaction of

.....(*abbreviated name of the Employer*)....., THEN, the above Bond shall be void, but otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

SCHEDULE No. 1

Particulars of the Equipment handed over	Quantity	Particulars of Dispatch title Documents		Value of the Equipment	Signature of the Attorney in token of receipt
		RR/GR No. date of lading	Carrier		

For and on behalf of
M/s.....

WITNESS

1. Signature.....

Signature.....

Name.....

Name.....

Address.....

Address.....

2. Signature.....

Authorised representative

Name.....

(Common Seal)

Address.....

(In case of Company)

Indemnity Bonds are to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute Indemnity Bonds, (iii) In case of (ii), the original Power of Attorney if it is specifically for this Contract or a photo-stat copy of the Power of Attorney if it is General Power of Attorney and such documents should be attached to Indemnity Bond.

11. FORM OF AUTHORISATION LETTER

Ref. No:

Date :

To

M/s.....

.....

.....

REF.: Contract No. dated for
awarded by(*insert name of the Employer*).....

Dear Sir,

Kindly refer to Contract No. dated for You are hereby authorised on behalf of (*Name of Employer*)..... a company incorporated under the laws of Companies Act 1956 and having its Registered Office at(*registered address of the Employer*) and its Project at to take physical delivery of materials/equipments covered under Dispatch Document/Consignment Note No.*..... dated and as detailed in the enclosed schedule for the sole purpose of successful performance of the aforesaid contract and for no other purpose, whatsoever.

(Signature of Project Authority)**

Designation.....

Date.....

Encl: As Above.

** To be signed not below the rank of Manager.

* Mention LR/RR No.

Schedule of Material/Equipment covered under Dispatch Title Document (RR No./LR No.)

Sl. No.	Contract Name	NOA No/ CA No.	Description of Materials/ Equipments	Spec. No.	Qty.	Value	Remarks

(Signature of the Project Authority)

(Designation)

(Date)

12. FORM OF TRUST RECEIPT FOR PLANT, EQUIPMENT AND MATERIALS RECEIVED

We M/s.(*insert name of the Contractor*) having our Principal place of business at having been awarded a Contract No. dated for (*insert Package name alongwith name of the Project*)..... by(*insert name of the Employer*)

We do hereby acknowledge the receipt of the Plant, Equipment and Materials as are fully described and mentioned under Documents of Title/RR/LR etc. and in the schedule annexed hereto, which shall form an integral part of this receipt as "Trustee" of (*insert name of the Employer*)..... The aforesaid materials etc. so received by us shall be exclusively used in the successful performance of the aforesaid Contract and for no other purpose whatsoever. We undertake not to create any charge, lien or encumbrance over the aforesaid materials etc, in favour of any other person/institution(s)/Banks.

For M/s
(*Contractor's Name*)

Dated :

(AUTHORISED SIGNATORY)

Place :

SEAL OF COMPANY

13. FORM OF EXTENSION OF BANK GUARANTEE

Ref. No.....

Dated:.....

To: *[Name and address of the Owner/ Employer]*

Dear Sirs,

Sub.: Extension of Bank Guarantee No. dated for,
issued to you on behalf of M/s.(*insert name of the Contractor*) in
respect of Contract No. dated for (*insert name of the
Package alongwith the Project name*) (hereinafter called original Bank
Guarantee).

At the request of M/s..... (*insert name of the Contractor*), We(*insert
name & address of the issuing bank*), a Bank organized under the laws of
..... and having its Registered/Head Office at(*insert address of registered
office of the bank*)..... do hereby extend our liability under the above-mentioned
Guarantee No. Dated for a further period of
Years/Months from to expire on Except as provided above, all other
terms and conditions of the original Bank Guarantee No. dated
shall remain unaltered and binding.

Please treat this as an integral part of the original Guarantee to which it would be attached.

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature_____

Name_____

Designation_____

POA Number_____

Contact Number(s): Tel._____Mobile_____

Fax Number_____

email _____

Common Seal of the Bank_____

Witness:

Signature_____

Name_____

Address_____

Contact Number(s): Tel._____Mobile_____

email _____

Note :

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.

**14. FORM OF POWER OF ATTORNEY FOR JOINT VENTURE
(Not Applicable)**

KNOW ALL MEN BY THESE PRESENTS THAT WE , the Partners whose details are given hereunder have formed a Joint Venture under the laws of and having our Registered Office(s)/Head Office(s) at (hereinafter called the 'Joint Venture' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) acting through M/s being the Partner in-charge do hereby constitute, nominate and appoint M/s..... a Company incorporated under the laws of and having its Registered/Head Office at as our duly constituted lawful Attorney (hereinafter called "Attorney" or "Authorised Representative" or "Partner In-charge") to exercise all or any of the powers for and on behalf of the Joint Venture in regard to Specification No..... Package the bids for which have been invited by (insert name of the Employer alongwith address) (hereinafter called the 'Employer') to undertake the following acts :

- i) To submit proposal and participate in the aforesaid Bid Specification of the Employer on behalf of the "Joint Venture".
- ii) To negotiate with the Employer the terms and conditions for award of the Contract pursuant to the aforesaid Bid and to sign the Contract with the Employer for and on behalf of the "Joint Venture".
- iii) To do any other act or submit any document related to the above.
- iv) To receive, accept and execute the Contract for and on behalf of the "Joint Venture".

It is clearly understood that the Partner In-charge (Lead Partner) shall ensure performance of the Contract(s) and if one or more Partner fail to perform their respective portions of the Contract(s), the same shall be deemed to be a default by all the Partners.

It is expressly understood that this Power of Attorney shall remain valid binding and irrevocable till completion of the Defect Liability Period in terms of the Contract.

The Joint Venture hereby agrees and undertakes to ratify and confirm all the whatsoever the said Attorney/ Authorised Representatives/Partner in-charge quotes in the bid, negotiates and signs the Contract with the Employer and/or proposes to act on behalf of the Joint Venture by virtue of this Power of Attorney and the same shall bind the Joint Venture as if done by itself.

IN WITNESS THEREOF the Partners Constituting the Joint Venture as aforesaid have executed these presents on this day of under the Common Seal(s) of their Companies.

for and on behalf of the
Partners of Joint Venture

.....

.....

.....

The Common Seal of the above Partners of the Joint Venture:

The Common Seal has been affixed there unto in the presence of:

WITNESS

1. Signature.....

Name

Designation

Occupation

2. Signature.....

Name

Designation

Occupation

Note :

1. For the purpose of executing the Agreement, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
2. The Agreement shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.

**15. FORM OF UNDERTAKING BY THE JOINT VENTURE PARTNERS
(Not Applicable)**

THIS JOINT DEED OF UNDERTAKING executed on this..... day of..... Two Thousand and..... by a company incorporated under the laws of and having its Registered Office at(hereinafter called the "Party No.1" which expression shall include its successors, executors and permitted assigns) and M/s.....a company incorporated under the laws of and having its Registered Office at (hereinafter called the "Party No.2" which expression shall include its successors, executors and permitted assigns) and M/s..... a Company incorporated under the laws of and having its Registered Office at (hereinafter called the "Party No.3" which expression shall include its successors, executors and permitted assigns) for the purpose of making a bid and entering into a contract [hereinafter called the "Contract" {in case of award}] against the Specification No..... for (*insert name of the package alongwith project name*) of (*insert names of the Employer*), a Company incorporated under the Companies Act of 1956 having its registered office at(*insert registered address of the Employer*)..... (hereinafter called the "Employer").

WHEREAS the Party No.1, Party No.2 and Party No.3 have entered into an Agreement dated

AND WHEREAS the Employer invited bids as per the above mentioned Specification for the design, manufacture, supply, erection, testing and commissioning of Equipment/Materials stipulated in the bidding documents under (*insert name of the package alongwith project name*)

AND WHEREAS Clause 9.3, Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure-A to BDS forming part of the bidding documents, inter-alia stipulates that an Undertaking of two or more qualified manufacturers as partners, meeting the requirements of Qualification Criteria in Annexure-A to BDS, as applicable may bid, provided, the Joint Venture fulfills all other requirements under Clause 9.3 (c) of ITB and Qualification Criteria in Annexure-A to BDS and in such a case, the Bid Forms shall be signed by all the partners so as to legally bind all the Partners of the Joint Venture, who will be jointly and severally liable to perform the Contract and all obligations hereunder.

The above clause further states that this Undertaking shall be attached to the bid and the Contract performance guarantee will be as per the format enclosed with the bidding document without any restrictions or liability for either party.

AND WHEREAS the bid is being submitted to the Employer vide proposal No.....dated by Party No.1 based on this Undertaking between all the parties; under these presents and the bid in accordance with the requirements of Clause 9.3,

Section-ITB and BDS (documents establishing the Qualification of Bidder) & Qualification Criteria in Annexure-A to BDS, has been signed by all the parties.

NOW THIS UNDERTAKING WITNESSETH AS UNDER:

In consideration of the above premises and agreements all the parties of this Deed of Undertaking do hereby declare and undertake:

1. In requirement of the award of the Contract by the Employer to the Joint Venture Partners, we, the Parties do hereby undertake that M/s..... the Party No.1, shall act as Lead Partner and further declare and confirm that we the parties to the Joint Venture shall jointly and severally be bound unto the Employer for the successful performance of the Contract and shall be fully responsible for the design, manufacture, supply and successful performance of the equipment in accordance with the Contract:
2. In case of any breach or default of the said Contract by any of the parties to the Joint Venture, the party(s) do hereby undertake to be fully responsible for the successful performance of the Contract and to carry out all the obligations and responsibilities under the Contract in accordance with the requirements of the Contract.
3. Further, if the Employer suffers any loss or damage on account of any breach in the Contract or any shortfall in the performance of the equipment in meeting the performances guaranteed as per the specification in terms of the Contract, the Party(s) of these presents undertake to promptly make good such loss or damages caused to the Employer, on its demand without any demur. It shall not be necessary or obligatory for the Employer to proceed against Lead Partner to these presents before proceeding against or dealing with the other Party(s), the Employer can proceed against any of the parties who shall be jointly and severally liable for the performance and all other liabilities/obligations under the Contract to the Employer.
4. The financial liability of the Parties of this Deed of Undertaking to the Employer, with respect to any of the claims rising out of the performance or non-performance of the obligations set forth in this Deed of Undertaking, read in conjunction with the relevant conditions of the Contract shall, however not be limited in any way so as to restrict or limit the liabilities or obligations of any of the Parties of this Deed of Undertaking.
5. It is expressly understood and agreed between the Parties to this Undertaking that the responsibilities and obligations of each of the Parties shall be as delineated in Appendix – I *(to be suitably appended by the Parties alongwith this Undertaking in its bid)* to this Deed of Undertaking. It is further undertaken by the parties that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities of the Parties under the Contract.
6. It is also understood that this Undertaking is provided for the purposes of undertaking joint and several liabilities of the partners to the Joint Venture for

submission of the bid and performance of the Contract and that this Undertaking shall not be deemed to give rise to any additional liabilities or obligations, in any manner or any law, on any of the Parties to this Undertaking or on the Joint Venture, other than the express provisions of the Contract.

7. This Undertaking shall be construed and interpreted in accordance with the provisions of the Contract.
8. In case of an award of a Contract, we the parties to this Deed of Undertaking do hereby agree that we shall be jointly and severally responsible for furnishing a Contract performance security from a bank in favour of the Employer in the currency/currencies of the Contract.
9. It is further agreed that this Deed of Undertaking shall be irrevocable and shall form an integral part of the bid and shall continue to be enforceable till the Employer discharges the same or upon the completion of the Contract in accordance with its provisions, whichever is earlier. It shall be effective from the date first mentioned above for all purposes and intents.

IN WITNESS WHEREOF, the Parties to this Deed of Undertaking have through their authorised representatives executed these presents and affixed Common Seals of their companies, on the day, month and year first mentioned above.

Common Seal of
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated

For Lead Partner (Party No.-1)
For and on behalf of M/s
.....

Name

Designation

Signature

(Signature of the authorized
representative)

WITNESS :

I.

II.

Common Seal of
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated

For Party No.-2
For and on behalf of
M/s.....

Name

(Signature of the authorized
representative)

Designation

Signature

WITNESS :

I.

II.

Common Seal of
has been affixed in my/ our
presence pursuant to Board of
Director's Resolution dated

For Party No.-3
For and on behalf of M/s.
.....

Name

Designation

Signature

(Signature of the authorized
representative)

WITNESS :

I.

II.

Note :

1. For the purpose of executing the Joint Deed of Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of Joint Venture.
2. The Undertaking shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.

16. FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CREDIT/FACILITIES

BANK CERTIFICATE

This is to certify that M/s. _____ (*insert Name & Address of the Contractor*) _____ who have submitted their bid to(*insert name of the Employer*)..... against their tender specification Vide ref. No. for (*insert name of the package alongwith the project name*) is our customer for the past years.

Their financial transaction with our Bank have been satisfactory. They enjoy the following fund based and non fund based limits including for guarantees, L/C and other credit facilities with us against which the extent of utilization as on date is also indicated below:

Sl. No.	Type of Facility	Sanctioned Limit as on Date	Utilisation as on Date

This letter is issued at the request of M/s. _____.

Signature _____

Name of Bank _____

Name of Authorised
Signatory _____

Designation _____

Phone No. _____

Address _____

SEAL OF THE BANK

17. FORM OF OPERATIONAL ACCEPTANCE

Date.....

Name of Contract.....

Contract No.....

To :

(Name and address of the Contractor)

Dear Ladies and/or Gentlemen,

Pursuant to GCC 20 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated relating to the *(insert brief description of the Facilities)*..... we hereby notify you that the we System tests and Acceptance tests of the following part(s) of the Facilities were satisfactorily completed on the date specified below :

1. Description of the Facilities or part thereof
.....
2. Date of Operational Acceptance :.....

This letter does not relieve you of your obligation during the Defects Liability Period and Latent Defect warranty.

Very truly yours,

Title
(Project Manager)

FORM No. 18

FORM OF SAFETY PLAN TO BE SUBMITTED BY THE CONTRACTOR WITHIN
THIRTY DAYS OF AWARD OF CONTRACT

[TO BE EXECUTED ON A NON JUDICIAL STAMP PAPER OF APPROPRIATE VALUE]

SAFETY PLAN

THIS SAFETY PLAN is made this day of 20..... by a Company registered under the Companies Act, 1956 or 2013, as the case may be/Partnership firm/proprietary concern having its Registered Office at[*to be modified suitably for JV Contractor*] (hereinafter called as 'Contractor' which expression shall include its successors and permitted assigns) for approval of(*insert name of the Employer*)....., a company incorporated under the Companies Act, 1956 having its Registered Office at(*insert registered address of the Employer*)..... for its Contract for(*insert package name, project name alongwith Specification number of the Contract*).....

WHEREAS(*abbreviated name of the Employer*)..... has awarded to the Contractor the aforesaid Contract vide its Notification of Award/Contract No. dated and Amendment No. (applicable when amendments have been issued) (hereinafter called the "Contract") in terms of which the Contractor is required to submit 'Safety Plan' alongwith certain documents to the Engineer In-Charge/Project Manager of the Employer within Thirty (30) days of Notification of Award for its approval.

NOW THEREFORE, the Contractor undertakes to execute the Contract as per the safety plan as follows:

1. THAT the Contractor shall execute the works as per provisions of Bidding Documents including those in regard to Safety Precautions / provisions as per statutory requirements.
2. THAT the Contractor shall execute the works in a well planned manner from the commencement of Contract as per agreed mile stones of work completion schedule so that planning and execution of construction works goes smoothly and consistently through out the contract duration without handling pressure in last quarter of the financial year/last months of the Contract and the same shall be finalized in association with POWERGRID Engineer In-charge/Project Manager from time to time as required.
3. THAT the Contractor has prepared the safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site, which is enclosed at **Annexure - 1A (SP)** for acceptance and approval of Engineer In-charge/Project Manager. The Contractor shall ensure that on approval of the same from Engineer In-charge/Project Manager , the approved copies shall be circulated to

Employer's personnel at site [Supervisor(s)/Executive(s)] and Contractor's personnel at site [Gang leader, supervisor(s) / stewards etc.] in their local language / language understood by gang.

THAT the Contractor has prepared minimum manpower deployment plan, activity wise as stated above, which is enclosed at **Annexure - 1B (SP)** for approval of Engineer In-charge/Project Manager of the Employer.

4. THAT the Contractor shall ensure while executing works the work force is provided with training by the construction Agencies as per applicable Laws in this regard. In addition at least 10 day's Induction training shall be provided by the Agency to the erection/stringing/commissioning staff/gang with maintenance of documentation. Such training shall not be necessary in case the work force has previously undergone training under the same or other Construction agency working in POWERGRID for similar work. For the above purpose, Recognition of Prior Learning (RPL) shall also be acceptable as per the Government directives. Hired gang workers shall also follow safe working procedures and safety norms as is being followed by company's workmen. It should also be ensured by the contractor that certified fitters who are climbing towers / doing stringing operations can be easily identifiable with a system like issue of Badge / Identification cards (ID cards) etc. Colour identification batches should be worn by the workers. Contractor has to ensure that inexperience workers / unskilled workers should not be deployed for skilled job. The Agency shall issue an induction training records to POWERGRID site in-charge.
5. THAT the Contractor's Safety Supervisor or Safety Steward is dedicatedly available fulltime at every construction site and shall brief to each worker daily before start of work about safety requirement and warn about imminent dangers and precautions to be taken against the imminent dangers (Daily Safety Drill). This is to be ensured without fail by Contractor and maintain record of each gang about daily safety instructions issued to workers and put up to POWERGRID site In-charge for his review and record.
6. THAT the Contractor shall ensure that the Gang leader should be experienced and well versed with the safe working procedures applicable for transmission line/ Sub Station works. The Safety Steward/Supervisor from Contractor's own roll having thorough knowledge about the works would be deployed so as to percolate safety instructions upto the grass root level in healthy spirits. Contractor has to ensure close supervision while executing critical locations of transmission lines / sub stations and ensures that all safety instructions are in place and are being followed.
7. The Contractor shall prepare a detailed list of all Tool & Plants (T&P) including lifting machines, lifting tools/ lifting tackles/ lifting gears and all types of ropes and slings etc. to be deployed as per work requirement, including or better than that the requirements as specified in the Technical Specifications and submit the same to POWERGRID Engineer-in-charge / Project Manager for acceptance / approval.

8. THAT the Contractor shall maintain in healthy and working condition all kind of Equipment's / Machineries / Lifting tools and tackles / All kind of Ropes including wire ropes / Polypropylene ropes etc. used for Lifting purpose during execution of the project and get them periodically examined and load tested for safe working load in accordance with relevant provisions and requirement of Building & other construction workers Regulation of Employment and Conditions of Services Act and Central Rule, Factories Act 1948, Indian Electricity Act 2003, CEA regulation in this regard before start of the project. A register of such examinations and tests shall be properly maintained by the contractor and shall be promptly produced as and when desired by the Engineer In-charge/Project Manager or by the person authorized by him. The Contractor has to ensure to give special attention on the formation / condition of eye splices of wire rope slings as per requirement of IS 2762 Specification for wire rope slings and sling legs.

THAT the Contractor has prepared a list of all Lifting machines, lifting Tools and Tackles etc. All types of ropes and Slings which are subject to safe working load is enclosed at **Annexure – 2 (SP)** for review and approval of Engineer In-charge/Project Manager of POWERGRID.

9. THAT the Contractor has to procure sufficient quantity of Personal Protective Equipment (PPE) conforming to Indian / International standards and provide these equipment to every workman at site as per need and to the satisfaction of Engineer-in-charge/Project Manager of POWERGRID. The Contractor's Site Supervisor/ Project Manager has to ensure that all workmen must use Personal Protective Equipment at site (**As per Annexure- 3(SP)**).

Proper control by Contractor shall be exercised such that before work commencement all workers are issued with required PPEs at site, use of safety shoes by workers working on ground, canvas shoes by workers working at height, rubber gum boots during rains/concreting/marshy land works, Twin Lanyard Full body Safety Harness with attachment of light weight such as aluminum alloy etc. and having features of automatic locking arrangement of snap hook by all workers working at height for more than three meters and also horizontal life line for horizontal movement on tower are arranged. No half body harness shall be used at site. Use of Retractable type fall-arrestors by workers for ascending / descending on suspension insulator string and other similar works etc., use of mobile fall arrestor for ascending/descending from tower by all workers should be ensured. Use of cotton / leather hand gloves as per requirement and induction safety helmets, line testers, electrical resistance hand gloves while operating electrical installations / switches. Face shield for protecting eyes while doing welding works and dust masks as per work requirement shall be ensured. Reflective jackets to be used by all workmen at site and differently coloured such jackets by the persons working at height. Requisite Safety net shall be used for reducing the risk of injury / damage.

The Contractor shall have to take action against the workers not using Personal Protective Equipment at site and those workers shall be asked to rest for that day and suitable penalty shall be imposed by the Contractor as a deterrent on the associated

defaulting persons. POWERGRID may issue warning letter to Project Manager of contractor in violation of above norms.

THAT the Contractor shall prepare a detailed list of PPEs, activity wise, to commensurate with manpower deployed, which is enclosed at **Annexure - 3 (SP)** for review and approval of Engineer In-charge/Project Manager. It shall also be ensured that the sample of these equipment shall be got approved from POWERGRID Engineer In-charge. The contractor shall submit relevant test certificates as per IS / International Standard as applicable to PPEs used during execution of work. All the PPE's to be distributed to the workers shall be checked by POWERGRID Engineer In-charge on routine basis.

The Contractor also agrees for addition / modification to the list of PPE, if any, as advised by Engineer In-Charge/Project Manager of Employer.

10. THAT the Contractor shall procure, if required sufficient quantity of Earthing Equipment / Earthing Devices complying with requirements of relevant IEC standards (Generally IECs standards for Earthing Equipments / Earthing Devices are – 855, 1230, 1235 etc.) and to the satisfaction of Engineer In-Charge/ Project Manager and contractor to ensures to maintained them in healthy condition.

THAT the Contractor has prepared / worked out minimum number of healthy Earthing Equipments with Earthing lead confirming to relevant IS / European standards per gang wise during stringing activity/as per requirement, which is enclosed herewith at **Annexure - 4 (SP)** for review and acceptance of Engineer In-Charge/ Project Manager prior to project execution of work.

11. THAT the Contractor shall provide communication facilities i.e. Walky – Talkie / Mobile Phone, Display of Flags / whistles for easy communication among workers during Tower erection / stringing activity, as per requirement.
12. THAT the Contractor undertakes to deploy qualified safety personnel responsible for safety as per requirements of Employer/Statutory Authorities.

THAT the Contractor shall deploy one full time officer exclusively as Safety Officer per contract.

THAT in addition to the Safety Officer, one Safety Supervisor will be deployed for every 25km of transmission line or part thereof of and one Safety Steward shall be deployed with each gang / activity of the transmission line construction works.

THAT, in addition to the Safety Officer, for all Supply-cum-installation contracts other than transmission line construction works, Safety Steward shall be deployed with each gang/ activity.

The Safety Officer shall be qualified and experienced as per BOCW ACT (Engineering graduate with two years' experience and Diploma in Industrial Safety or

alternatively a Bachelor of Science/ diploma in Engineering with 5 years' experience and Diploma in Industrial Safety) and will ensure compliance of safety requirement to satisfaction of Engineer In-charge /Project Manager/Safety Co-ordinator of the Employer. Such Safety Officers shall be assisted by suitable and adequate Safety Supervisors and Safety Stewards. The Safety Officer will report directly to his head of organization and not the Project Manager of Contractor He shall also not be assigned any other work except the work of safety. The curriculum vitae of such person shall be got cleared from POWERGRID Project Manager / Construction staff.

The Safety Supervisor shall be Bachelor of Science/diploma in Engineering with 2 years' relevant experience in safety.

The qualification of Safety Steward shall be ITI or equivalent with 2 years relevant experience in safety.

The Safety Officer shall ensure that all works being executed are as per approved safe work procedure and best industry practices. Inter-alia at least the following roles / responsibilities shall be discharged by the Safety Officer of the Agency:

- Ensure availability of Site Safety Steward/ Safety Supervisor before any commencement of work and that they shall leave site only after work completion. No work shall be started unless safety steward/ supervisor are available at site. Availability of healthy PPE's, First-aid and T&P shall be ensured by the Safety Officer.
- Ensure presence of full time Safety Supervisor / Safety Steward during tower erection / stringing and that they shall not leave the site before completion of daily work. In absence of Safety Supervisor / Safety Steward, the work shall not be undertaken.
- Ensure conduction of regular pep-talk at site before start of work, site audit/ inspection, Mock drills, First-aid training, Induction training to the new workers, safety awareness program and any on-site/on-job training as per works requirements. Issue of height passes to such skilled fitters and different cards to other fitters for proper identification during site work.
- Arrange for medical check-up of all workers maintenance of health and hygiene of all workers/gangs and site welfare activities
- Conduct period safety audit & inspections for all sites and arrange compliances.
- Ensure conditioning monitoring of PPEs and T&Ps with unique serial number marking for traceability, proof load testing before deployments, maintaining such records and submission to site-in-charge of Employer.
- Arrange for regular site inspection of PPE's and T&P's to be got done through POWERGRID site supervisor also. No tower erection / stringing work shall be started without presence of POWERGRID site supervisor

- Ensure availability of emergency action plan in case of any disaster event which shall include injury, electrocution, snake-bite, heat stroke, fire, storm, etc. and barricading and safety displays at sites.
- Reporting of Monthly safety activities to Site in-charge of Employer which shall include all incidents, near-miss events etc. Maintenance of all safety records.

The Safety Supervisor shall ensure that all works being executed are as per approved safe work procedure are circulated to all gang leaders and control measures are taken as per site risk assessment. Inter-alia at least the following role shall be discharged by the Safety Supervisor:

- Check availability of safe working procedures with the gangs at site
- Ensure that pep-talk is given before start of work every day, get the records and communicate.
- Ensure Prior Safety training to all workers.
- Arrange the display of safety poster, danger boards, safety flags and caution tape at sites.
- Check height workers having valid height pass and medical fitness of all workers and that no worker is allowed to work without valid medical fitness and height pass
- Ensure height working fitters use the safety belt and proper anchoring of safety belt hooks during working and movements.
- Ensure full time presence of Safety Steward with each gang / location / activity till work completion.
- Ensure that tower erection / stringing work is not started without presence of POWERGRID site supervisor.
- Inspection of PPE's and T&P's and ensure its healthiness, provide safety inspection sticker after verifying the third party certificates at site.
- Monitor safety audit/inspections points and arrange for the compliances.
- Report daily safety activities and other related safety issues to site safety officer / engineer.

The Safety Steward should monitor that all works being executed are as per approved safe work procedure and control measures taken as per site risk assessment. Inter-alia at least the following role shall be discharged by the Safety Steward:

- Ensure approved safe work procedure available at site at all time in language understood by majority of workers. Ensure that all workers clearly understand the approved work procedure, all the hazards are identified, control measures are taken as per risk assessment with the approved work procedure.
- Arrange the display of safety poster, danger boards, safety flags and caution tape at sites.
- Conduct pep-talk before start of work every day and record it.
- Check height workers having valid height pass and medical fitness of all workers and ensure that no worker is allowed to work without valid medical fitness and height pass.

- Ensure that safety training is imparted to all workers.
- Inspection of PPE's, T&P's and ensure its healthiness, that valid inspection stickers are available at site and shall ensure the marking on PPEs and T&P with unique number.
- Monitor that height workers are using the safety belt and ensure anchoring safety belt hook.
- Ensure that no worker is working under suspended load or height work activity.
- Shall have the authority to stop the work, when work is being executed in unsafe manner.
- Ensure that welfare and first-aid facilities are available at site.
- Ensure compliances of all safety audit and inspection points.
- Report daily safety activities and other related safety issues immediately to the Safety Officer / Safety Supervisor.

The name and details of Safety Officers/ Safety Supervisor/Safety Steward of contractor shall be informed before start of work in writing to Engineer In-charge of Employer. Any change of the incumbent is made during the currency of the contract shall be promptly intimated to the Engineer In-charge of Employer. The copy of organisation chart/ structure of the Contractor in regard to safety shall be submitted. The list is enclosed at **Annexure – 5A (SP).**

THAT the Contractor shall submit a list including details of Explosive Operator (if required), Safety supervisor / nominated person for safety for each such explosive activities. Such persons shall be trained in First Aid Techniques. The list is enclosed at **Annexure – 5B (SP).**

13. The Project Manager shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/or property, and/or equipment. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury/accident and he shall comply to remove shortcomings promptly. Further, the Project Manager shall have the right at his sole discretion to stop the work till the Safety Officer(s)/Safety Supervisor(s)/Safety Steward(s) is deployed by the Contractor. The Contractor after stopping the specific work can, if felt necessary, appeal against the order of stoppage of work to the Project Manager within 3 days of such stoppage of work and decision of the Project Manager of Employer in this respect shall be conclusive and binding on the Contractor.
14. THAT, if, any Employer's Engineer/ supervisor at site observes that the Contractor is failing to provide safe working environment at site as per agreed Safety Plan / POWERGRID Safety Rule/ Safety Instructions / Statutory safety requirement and creates hazardous conditions at site and there is possibility of an accident to workmen or workmen of the other contractor or public or the work is being carried out in an unsafe manner or he continues to work even after being instructed to stop the work by Engineer / Supervisor at site / RHQ / Corp. Centre, the Contractor shall be bound to pay a penalty of Rs. 10,000/ - per incident per day till the instructions are complied and as certified by Engineer / Supervisor of Employer at site. The work shall remain

suspended and no activity shall take place without compliance and obtaining clearance / certification of the Site Engineer / Supervisor of the Employer to start the work.

15. THAT, in case of an accident at Site, the Contractor shall be liable to pay a compensation to the Employer for further disbursement to the deceased family/ Injured persons as per GCC Clause GCC 18.3.3.24. The permanent disability has the same meaning as indicated in Employees' Compensation Act. The above stipulations is in addition to all other compensation payable to sufferer as per Employees' compensation Act / Rules

Notwithstanding above, the Contractor shall also be responsible for payment of sum as indicated at GCC Sub-Clause 18.3.3.25 which shall be deposited in Safety Corpus Fund pursuant to GCC Sub-Clause 18.3.3.26.

THAT as per the Employer's instructions, the Contractor agrees that this amount shall be deducted from their running bill(s) immediately after the accident, That the Contractor understands that this amount shall be over and above the compensation amount liable to be paid as per the Employees' Compensation Act /other statutory requirement/ provisions of the Bidding Documents.

16. THAT the Contractor shall submit Near-Miss-Accident report alongwith action plan for avoidance such incidence /accidents to Engineer – In-charge/ Project Manager of the Employer. Contractor shall also submit Monthly Safety Activities report and copy of the Monthly Safety Activities report also to be sent to Safety In-charge at RHQ of the Employer for his review record and instructions.
17. THAT the Contractor is submitting a copy of Safety Policy/ Safety Documents of its Company which is enclosed at **Annexure – 6 (SP)** and ensure that the safety Policy and safety documents are implemented in healthy spirit.
18. THAT the Contractor shall make available of First Aid Box [Contents of which shall be as per Building & Other Construction Workers Act (Regulation of Employment and Conditions of Services Act and Central Rule 1998 / POWERGRID Guidelines)] to the satisfaction of Engineer In-Charge/ Project Manager with each gang at site and additional at camp and ensures that trained persons in First Aid Techniques with each gang before taking up the execution of work.
19. THAT the Contractor shall submit an 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. which is enclosed at **Annexure – 7 (SP)** for approval of the Engineer In-Charge/ Project Manager of the Employer before start of project.

20. THAT the Contractor shall organise Safety Training Programs on Safety, Health and Environment and for safe execution of different activities of works i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. for their own employees including sub-contractor workers on regular basis.

The Contractor will submit copy of the module of training program, enclosed at **Annexure - 9 (SP)**, to Engineer In-charge/Project Manager of the Employer for its acceptance and approval and records maintained.

21. THAT the Contractor shall conduct safety audit, as per Safety Audit Check Lists enclosed at **Annexure - 8 (SP)**, by his Safety Officer(s) every month during construction of Transmission Lines / Sub Stations / any other work and copy of the safety audit report shall be forwarded to the Employer's Engineer In-charge / Site In-charge/Project Manager for his comments and feedback. During safety audit, healthiness of all Personal Protective Equipments (PPEs) shall be checked individually by safety officer of contractor and issue a certificate of its healthiness or rejection of faulty PPEs and contractor has to ensure that all faulty PPEs and all faulty lifting tools and tackles should be destroyed. Contractor has to ensure that each gang be audited for safety at least once in two months. The Employer's site officials shall also conduct safety audit from time to time when construction activities are under progress. Apart from above, the Employer may also conduct surveillance safety audits. The Employer may take action against the person / persons as deemed fit under various statutory acts/provisions under the Contract for any violation of safety norms / safety standards and shall have right to stop the unsafe work from being done.
22. THAT the Contractor shall develop and display Safety Posters of construction activity at site and also at camp where workers are generally residing.
23. THAT the Contractor shall ensure to provide potable and safe drinking water for workers at site / at camp with required hygiene and sanitation.
24. THAT the Contractor shall do health checkup of all workers from competent agencies as per statutory requirements and reports will be submitted to Engineer In-Charge of the Employer along with the monthly reports.
25. THAT the Contractor shall submit information along with documentary evidences in regard to compliance to various statutory requirements as applicable which are enclosed at **Annexure - 10A (SP)**. In case of work being carried out through sub-contractors the sub - contractor's workmen / employees shall also be considered as the contractor's employees / workmen

The Contractor shall also submit details of Insurance Policies taken by the Contractor for insurance coverage against accident for all employees are enclosed at **Annexure - 10B (SP)**.

26. THAT a check-list in respect of aforesaid enclosures along with the Contractor's remarks, wherever required, is attached as **Annexure – Check List** herewith.

THE CONTRACTOR shall incorporate modifications/changes in this 'Safety Plan' necessitated on the basis of review/comments of the Engineer In-Charge/Project Manager within fourteen (14) days of receipt of review/comments and on final approval of the Engineer In-Charge/Project Manager of this 'Safety Plan', the Contractor shall execute the works under the Contract as per approved 'Safety Plan'.

Further, the Contractor has also noted that the first progressive payment towards Services Contract shall be made on submission of 'Safety Plan' along with all requisite documents and approval of the same by the Engineer In-Charge/Project Manager of the Employer.

IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorised representative under the common seal of the Company, the day, month and year first above mentioned.

For and on behalf of

M/s.....

WITNESS

1. Signature.....

Signature.....

Name.....

Name.....

Address.....

Address.....

2. Signature.....

Authorised representative

Name.....

(Common Seal)

Address.....

(In case of Company)

Note:

All the annexure referred to in this "Safety Plan" are required to be enclosed by the contractor as per the attached " Check List "

1. Safety Plan is to be executed by the authorised person and (i) in case of contracting Company under common seal of the Company or (ii) having the power of attorney issued under common seal of the company with authority to execute such contract documents etc. and such documents should be attached to this Safety Plan.

2. For all safety monitoring/ documentation, Engineer In-charge / Regional In-charge of safety at RHQ shall be the nodal Officers for communication.
3. POWERGRID have right to modify this agreement with effect for the future at any time in case of any statutory law change or any other reason.

CHECK LIST FOR SAFETY PLAN

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
1.	Annexure - 1A (SP) Safe work procedure for each activity i.e. foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. to be executed at site in language understood by workers / gang.	Yes/No	
2.	Annexure - 1B (SP) Manpower deployment plan, activity wise foundation works including civil works, erection, stringing (as applicable), testing & commissioning, disposal of materials at site / store etc. No work to start in case manpower deployment is not as per approved plan.	Yes/No	
3.	Annexure - 2 (SP) List of Lifting Machines i.e. Crane, Hoist, Triffor, Chain Pulley Blocks etc. and Lifting Tools and Tackles i.e. D shackle, Pulleys, come along clamps, wire rope slings etc. and all types of ropes i.e. Wire ropes, Poly propylene Rope etc. used for lifting purposes along with test certificates. Contractor shall get T&P available verified by site engineer of employer before start of project.	Yes/No	
4.	Annexure - 3 (SP) List of Personal Protective Equipment (PPE), activity wise including the following along with test certificate of each as applicable: 1. Industrial Safety Helmet to all workmen at site. (EN 397 / IS 2925) with chin strap and back stay arrangement. 2. Safety shoes without steel toe to all ground level workers and canvas shoes for workers working on tower.	Quantities to be specified	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	3. Rubber Gum Boot to workers working in rainy season / concreting job IS 12254. 4. Twin lanyard Full Body Safety harness with shock absorber and leg strap arrangement for all workers working at height for more than three meters. Safety Harness should be with attachments of light weight such as of aluminium alloy etc. and having a feature of automatic locking arrangement of snap hook and comply with EN 361 / IS 3521 standards. 5. Mobile fall arrestors for safety of workers during their ascending / descending from tower / on tower. EN 353 -2 (Guided type fall arresters on a flexible anchorage line.) 6. Retractable type fall arrestor (EN360: 2002) for ascending / descending on suspension insulator string etc. 7. Providing of good quality cotton hand gloves / leather hand gloves for workers engaged in handling of tower parts or as per requirement at site. 8. Electrical Resistance hand gloves to workers for handling electrical equipment / Electrical connections. IS : 4770 9. Dust masks to workers handling cement as per requirement. 10. Face shield for welder and Grinders. IS : 1179 / IS : 2553 11. Reflective Jackets to identify the workers IS 1509 12. Safety nets to <u>protect the man and material during fall from height</u> IS 11057 13. Induction safety helmets to warn the worker from induction /charged area and to protect from head injury. 14. Line tester IS 50191,61230,61219 15. Soulder pad to protect the soulder injury 16. Horizontal life line to protect the worker from fall from height ISO 1140 17. Binocular to check the workers working at heights. Other PPEs, if any, as per requirement etc.		

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	The typical list of PPEs per transmission line gang is enclosed herewith.		
5.	Annexure - 4 (SP) List of Earthing Equipment / Earthing devices with Earthing lead conforming to IECs for earthing equipments are - (855, 1230, 1235 etc.) gang wise for stringing activity/as per requirement	Yes/No	
6.	Annexure - 5A (SP) List of Qualified Safety Officers/ Safety Supervisor/Safety Steward of contractor shall be informed before start of work in writing to Engineer In-charge of Employer. Any change of the incumbent is made during the currency of the contract shall be promptly intimated to the Engineer In-charge of Employer. The copy of organisation chart/ structure of the Contractor in regard to safety shall be submitted	Yes/No	
7.	Annexure - 5B (SP) List including details of Explosive Operator (if required), Safety supervisor / nominated person for safety for each such explosive activities. Such persons shall be trained in First Aid Techniques	Yes/No	
8.	Annexure - 6 (SP) Copy of Safety Policy/ Safety Document of the Contractor's company	Yes/No	
9.	Annexure - 7 (SP) 'Emergency Preparedness Plan' for different incidences i.e. Fall from height, Electrocution, Sun Stroke, Collapse of pit, Collapse of Tower, Snake bite, Fire in camp / Store, Flood, Storm, Earthquake, Militancy etc. while carrying out different activities under execution i.e. foundation works including civil works, erection, stringing (as applicable), testing &	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	commissioning, disposal of materials at site / store etc.		
10.	Annexure - 8 (SP) Safety Audit Check Lists (Formats to be enclosed)	Yes/No	
11.	Annexure - 9 (SP) Copy of the module of Safety Training Programs on Safety, Health and Environment, safe execution of different activities of works for Contractor's own employees on regular basis and subcontractor employees. Contractor to maintain documentations of all training programs.	Yes/No	
12.	Annexure - 10A (SP) Information alongwith documentary evidences in regard to the Contractor's compliance to various statutory requirements including the following:		
(i)	Electricity Act 2003 _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(ii)	Factories Act 1948 _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(iii)	Building & other construction workers (Regulation of Employment and Conditions of Services Act and Central Act 1996) and Welfare Cess Act 1996 with Rules. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(iv)	Employee's Compensation Act and Rules.	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	[Name of Documentary evidence in support of compliance]		
(v)	Public Insurance Liabilities Act 1991 and Rules. [Name of Documentary evidence in support of compliance]	Yes/No	
(vi)	Indian Explosive Act 1948 and Rules. [Name of Documentary evidence in support of compliance]	Yes/No	
(vii)	Indian Petroleum Act 1934 and Rules. [Name of Documentary evidence in support of compliance]	Yes/No	
(viii)	License under the contract Labour (Regulation & Abolition) Act 1970 and Rules. [Name of Documentary evidence in support of compliance]	Yes/No	
(ix)	Indian Electricity Rule and amendments if any, from time to time. [Name of Documentary evidence in support of compliance]	Yes/No	
(x)	The Environment (Protection) Act 1986 and Rules. [Name of Documentary evidence in support of compliance]	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
(xi)	Child Labour (Prohibition & Regulation) Act 1986. _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(xii)	National Building Code of India 2005 (NBC 2005). _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(xiii)	Indian standards for construction of Low/ Medium/ High/ Extra High Voltage Transmission Line _____ [Name of Documentary evidence in support of compliance]	Yes/No	
(iv)	Any other statutory requirement(s) [please specify] _____ [Name of Documentary evidence in support of compliance]	Yes/No	
13.	Annexure - 10B (SP) Details of Insurance Policies alongwith documentary evidences taken by the Contractor for the insurance coverage against accident for all employees as below:		
(i)	Under Employee's Compensation Act and Rules. _____ [Name of Documentary evidence in support of insurance taken]	Yes/No	
(ii)	Public Insurance Liabilities Act 1991 _____	Yes/No	

S. N.	Details of Enclosure	Status of Submission of information/ documents	Remarks
	<i>[Name of Documentary evidence in support of insurance taken]</i>		
(iii)	Any Other Insurance Policies _____ <i>[Name of Documentary evidence in support of insurance taken]</i>	Yes/No	

The typical list of PPEs per transmission line gang as enclosed of Annexure 3 (SP).

<u>Indicative list for Personal Protective Equipment's for TL Gang</u>				
Sl#	Item	Reference standards or better	Unit	Qty/Gang
1	Safety Helmet Yellow	IS 2925	No	50
2	Safety Helmet Blue	IS 2925	No	10
3	Gumboot	IS 12254	Pair	10
4	Safety Shoes	IS 15298	Pair	60
5	Hand Gloves Cotton	IS 6994	Pair	120
6	Hand Gloves Rubber	IS 4770	Pair	100
7	11/33KV Gloves	IS: 4770	Pair	10
8	Nose Mask	IS : 9623	No	60
9	First Aid Box	BOCW ACT sec.231 & schedule III	No	4
10	FRP Ladder/Steel Ladder/Rope Ladder		No	2
11	Full Body Harness with double lanyard	(IS 3521 : 1999) and comply with EN- 361 standards	No	15
12	Caution Board/Red & Green Flag	-	No	100
13	Barricading Tape	-	Bundle	10
14	Shoulder Pad	-	No	40
15	Reflective Jacket	-	No	60
16	Discharge Rod 11kV/33kV	Complies with EN 50191, EN 61230 and EN 61219	Set	10
17	Discharge Rod 220kV/400kV	Complies with EN 50191, EN 61230 and EN 61219	Set	12
18	Whistle/Mega Phone	-	Set	2
19	Walkie - Talkie	-	Pair	10
20	Horizontal Life Line System	16mm Polyamide	set	4
21	Fall Arrestor Rope	-	lot	4
22	Rope Grab Fall Arrestor	-	No	15
23	Retractable Fall Arrestor	EN 360	No	10
24	Binocular	-	No	3
25	Multi tester/Induction Tester	-	No	5
26	Induction Helmet	-	No.	10
27	Safety Net Set	IS: 5175	Lot	6

28	HV Line tester	EN 61326 & EN 61000	No.	2
29	Face shield	IS 1179	No.	2
30	ZERO POWER PLAIN GOGGLES	IS 1179	No.	30
31	Tent/ Sanitation Arrangements	-	Lot	1
Note:	This list is indicative for every gang and Contractor has to provide any additional PPEs as per statutory, site requirements and satisfaction of POWERGRID Project Incharge/Site Incharge.			

—

19. FORM FOR INFORMATION TO BE FURNISHED BY THE CONTRACTOR IN RESPECT OF THE PROCUREMENT MADE FROM MSE VENDORS

Pursuant to GCC Clause No. 15.4 , We hereby furnish the following information regarding the procurement made by us form Micro and Small Enterprises (MSEs) directly or through our sub-suppliers/sub-vendors as per the details given herein below:

Sl. No.	Contract Agreement No.	Name of Contractor /Supplier*	Item Description as per contract Agreement	Qty	Total Value (In Rs.)	Executing Region	Items/components/raw materials sourced from MSE vendor for production of item at column 4	Total Value of the items/components/raw materials used for item at column 4 (In Rs.)	Name of MSE Vendor	Category (only Micro or Small)	Whether MSE owned by persons belonging to SC/ST category
1	2	3	4	5	6	7	8	9	10	11	12

Further, we hereby declare and confirm that the information mentioned above is correct and complete to best of our knowledge and the category of MSE vendors, as mentioned in the table above, has been ascertained at our end.

Note:

- The Contractor shall be required to furnish the aforesaid information (contract-wise) on semi-annual basis i.e for period from 1st April to 30th September and from 1st October to 31st March for each Financial Year.
- Submission of aforesaid information for the preceding 6 months, in respect of all the contracts in the respective executing Region of POWERGRID, shall be a condition for processing of bills by POWERGRID for payment after 30th September /31st March, as the case may be.
- Only those items of Contract Agreement may be included which involve sourcing of items/components/raw materials/ services from MSEs.

Name of Contractor -----

Name of Authorised Person -----

Designation -----

Signature -----

20. FORM OF BANK GUARANTEE FOR CONTRACT PERFORMANCE (TO BE SUBMITTED BY THE BIDDER FOR ANNUAL MAINTENANCE PART OF THE CONTRACT AFTER DEFECT LIABILITY PERIOD)

(For the purpose of verification/ confirmation of this Bank Guarantee by the Employer, the Bank shall indicate 2 official email ids of the authorized signatories from Issuing Branch and also of the designated higher office (Corporate Office, Zonal Office etc) in the covering letter of the Bank forwarding the Bank Guarantee.)

Bank Guarantee No.

Date.....

Contract No.....

.....[Name of Contract].....

To: [Name and address of the Employer]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract") signed on (*insert date of the Contract*)..... between you and M/s (*Name of Contractor*), having its Principal place of business at (*Address of Contractor*) and Registered Office at(*Registered Address of Contractor*) ("the Contractor") concerning (*Indicate brief scope of work*) for the complete execution of the (*insert name of Package alongwith name of the Project*).....

By this letter we, the undersigned, ...(*insert name & address of the issuing bank*), a Bank (which expression shall include its successors, administrators, executors and assigns) organized under the laws of and having its Registered/Head Office at(*insert address of registered office of the bank*)..... do hereby irrevocably guarantee payment to you up to **i.e., Two Percent (2%) of the Total Contract Price for Six (06) years after Defect Liability period'** until ninety (90) days beyond completion of 'AMC after Defect Liability period' i.e., upto and inclusive of (*dd/mm/yy*).

We undertake to make payment under this Letter of Guarantee upon receipt by us of your first written demand signed by your duly authorized officer declaring the Contractor to be in default under the Contract and without cavil or argument any sum or sums within the above named limits, without your need to prove or show grounds or reasons for your demand and without the right of the Contractor to dispute or question such demand.

Our liability under this Letter of Guarantee shall be to pay to you whichever is the lesser of the sum so requested or the amount then guaranteed hereunder in respect of any demand duly made hereunder prior to expiry of the Letter of Guarantee, without being entitled to inquire whether or not this payment is lawfully demanded.

This letter of Guarantee shall remain in full force and shall be valid from the date of issue until ninety (90) days beyond completion of 'AMC after Defect Liability period' of the Facilities i.e. upto and inclusive of (dd/mm/yy) and shall be extended from time to time for such period (not exceeding one year), as may be desired by M/s. on whose behalf this Letter of Guarantee has been given.

Except for the documents herein specified, no other documents or other action shall be required, notwithstanding any applicable law or regulation.

Our liability under this Letter of Guarantee shall become null and void immediately upon its expiry, whether it is returned or not, and no claim may be made hereunder after such expiry or after the aggregate of the sums paid by us to you shall equal the sums guaranteed hereunder, whichever is the earlier.

All notices to be given under shall be given by registered (airmail) posts to the addressee at the address herein set out or as otherwise advised by and between the parties hereto.

We hereby agree that any part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Contractor, and this security may be exchanged or surrendered without in any way impairing or affecting our liabilities hereunder without notices to us and without the necessity for any additional endorsement, consent or guarantee by us, provided, however, that the sum guaranteed shall not be increased or decreased.

No action, event or condition which by any applicable law should operate to discharge us from liability hereunder shall have any effect and we hereby waive any right we may have to apply such law so that in all respects our liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed _____ (*value in figures*) _____ [*value in words*] _____.
2. This Bank Guarantee shall be valid upto _____ (*validity date*) _____.
3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before _____ (*validity date*) _____.

For and on behalf of the Bank

[*Signature of the authorised signatory(ies)*]

Signature _____

Name_____

Designation_____

POA Number_____

Contact Number(s): Tel._____Mobile_____

Fax Number_____

email _____

Common Seal of the Bank_____

Witness:

Signature_____

Name_____

Address_____

Contact Number(s): Tel._____Mobile_____

email _____

Note :

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.
3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph regarding applicability of ICC publication No: 758, the following may be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:

"This Guarantee is subject to Uniform Rules for Demand Guarantee, ICC publication No. 758 except that article 15(a) is hereby excluded."

4. At the time of issuance of the Bank Guarantee (including its extensions) through SFMS facility, the issuing bank will input the IFSC code of Beneficiary Bank as mentioned at GCC clause 9.4 in SCC in their Trade Finance Portal.

Additional paragraph regarding issuance of the Bank Guarantee through SFMS Platform (if applicable), the following should be added at the end of the proforma of the Bank Guarantee [i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee]:

“This Guarantee has been issued using SFMS Platform and the requisite communication in this regard has been forwarded to the Beneficiary Bank.”

21. FORMAT OF VALUE- ADDITION CERTIFICATE ON HALF-YEARLY BASIS (SEP 30 AND MAR 31), DULY CERTIFIED BY THE STATUTORY AUDITORS OF THE DOMESTIC MANUFACTURER

Dear Sir,

We have read and understood the provisions of “Policy for providing preference to Domestically Manufactured Iron & Steel Products in Government Procurement” [hereinafter, “Policy”] issued by the Ministry of Steel Government of India Vide Notification dated 8th May 2017 **and its revision dated 29th May 2019** including subsequent amendments/ modifications, if any.

In line with the provisions of the Policy, M/s.(Name of the Domestic Manufacturer) [hereinafter, “Domestic Manufacturer”] have submitted an Affidavit of self-certification to M/s. Power Grid Corporation of India Limited [hereinafter, POWERGRID] regarding Domestic Value Addition in Iron & Steel Products sourced from the Domestic Manufacturer for manufacturing/supply of Goods for [Enter the name of the Contract] awarded to[Enter the name of the Contractor] by POWERGRID, wherein they have agreed to abide by the terms and conditions of the Policy.

Further, in line with the Policy, the Statutory Auditor(s) of the Domestic Manufacturer have to issue a certificate on half-yearly basis (Sept 30 and March 31) duly certifying that the Domestic Value Addition made for Iron & Steel products sourced from the Domestic Manufacturer for manufacturing/supply of Goods for [Enter the name of the Contract] during the preceding 6 months, are in accordance with the Policy.

Accordingly, we, the Statutory Auditor(s) of the Domestic Manufacturer, certify that the Domestic Value addition, calculated as per the provisions of the Policy, for Iron & Steel products sourced from the Domestic Manufacturer for manufacturing/supply of Goods for [Enter the name of the Contract] during the preceding 6 months are as follows:

Name of the Product	Domestic Value addition for the preceding 6 months (i.e half year ending Sept 30/March 31 , 20....) in percentage

For and on behalf of,

Date:

<<Statutory Auditor's attestation>>

Firm Reg No. Membership No.

Note:

- 1. The Contractor shall be required to furnish the aforesaid certificate from their the Statutory auditors of the Domestic Manufacturer on semi-annual basis i.e for period from 1st April to 30th September and from 1st October to 31st March for each Financial Year.*
- 2. Submission of aforesaid certificate for the preceding 6 months shall be a condition for processing of bills by POWERGRID for payment after 30th September /31st March, as the case may be.*

22. FORM OF JOINT DEED OF UNDERTAKING BY THE COLLABORATOR /ASSOCIATE ALONGWITH THE BIDDER

(On Non-Judicial Stamp Paper of appropriate value)

THIS DEED OF UNDERTAKING executed this _____ Day of Two thousand and _____ by _____ a Company incorporated under the laws of _____ and having its registered office at _____ (hereinafter called the "Collaborator"/ "Associate" which expression shall include its successors, executors and permitted assigns) and _____ a company incorporated under the laws of _____ having its registered office at _____ (hereinafter called the "Bidder/Contractor" which expression shall include its successors, executors and permitted assigns) in favour of **Power Grid Corporation of India Ltd.**, having its registered office at B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi - 110016 (hereinafter called the "Employer" which expression shall include its successors, executors and permitted assigns)

WHEREEAS the "Employer" invited Bid as per its Specification No. _____ for the execution of _____.

AND WHEREAS Clause No. **2.2 (B)**, Annexure-A (BDS) of Section III, Vol. - I forming part of the Bid documents inter-alia stipulates that the Bidder alongwith its Collaborator / Associate must fulfill the Qualifying Requirement for the *_____ and be jointly and severally bound and responsible for the successful performance of the *_____ offered in the event the Bid submitted by the Bidder is accepted by the Employer resulting in a "Contract."

AND WHEREAS the Bidder has submitted its Bids to the Employer vide proposal No _____ dated _____ based on the collaboration of the Collaborator/Associate with the Bidder.

NOW THEREFORE THIS UNDERTAKING WITHNESSETH as under:

- 1.0 In consideration of the award of Contract by the Employer to the Bidder (hereinafter referred to as the "Contract") we, the Collaborator/Associate and the Bidder/Contractor do hereby declare that we shall be jointly and severally bound unto the Power Grid Corporation of India Ltd., Employer) for the successful performance of the *_____ and shall be fully responsible for the design, manufacture, testing, supply on FOR destination delivery at site basis, supervision of unloading at site, storage, erection, testing & commissioning and successful performance of the *_____ in accordance with the Contract specifications till defect liability and maintenance period.
- 2.0 Without in any way affecting the generality and total responsibility in terms of this Deed of Undertaking, the Collaborator /Associate in particular hereby agrees to depute their technical experts from time to time to the Bidder's/Contractor's works/Employer's Project site as mutually considered necessary by the Employer/Bidder/Contractor and the Collaborator/Associate to ensure proper

design, manufacture, testing, supply on FOR destination delivery at site basis, supervision of unloading at site, storage, erection, testing & commissioning and successful performance of the equipment in accordance with contract specifications and if necessary the Collaborator/Associate shall advise the manufacturer / Contractor suitable modifications of designs and implement necessary corrective measures to discharge the obligations under the Contract during implementation and maintenance of the system.

- 3.0 This Deed of Undertaking shall be construed and interpreted in accordance with the laws of India and the Courts in Delhi shall have exclusive jurisdiction in all matters arising under the undertaking.
- 4.0 As a security, the Collaborator/Manufacturer/Associate shall apart from the Contractor's performance guarantee, furnish a Contract Performance Guarantee from its Bank in favour of the Employer in a form acceptable to Purchaser. The value of such guarantee shall be equivalent to **ten percent (10%)** of price of the **UNMS/OSS System** as identified in the Contract awarded by the Employer to the Bidder/Contractor and it shall be part of guarantee towards the faithful performance/compliance of this Deed of Undertaking in terms of the Contract. The guarantee shall be unconditional, irrevocable and valid for the entire period of the Contract, namely until ninety (90) days beyond the defect liability period of *_____ under the Contract. The Bank Guarantee amount shall be payable to the Employer on demand without any reservation or demur.
- 5.0 We, the collaborator/the Bidder/Contractor/ Associate agree that this undertaking shall be irrevocable and shall form an integral part of the Contract and further agree that this undertaking shall continue to be enforceable till the Employer discharges it. It shall become operative from the effective date of Contract.

IN WITNESS WHEREOF the Collaborator/Associate and the Bidder/Contractor have through their Authorised Representative executed these presents and affixed Common seals of their respective Companies, on the day, month and year first above mentioned.

WITNESS

(For Collaborator/ Associate)

Signature

(Signature of the authorized representative)

Name

Office Address

Name

Common Seal of Company
.....

WITNESS

(For Bidder/Contractor)

Signature

Name

Office Address

(Signature of the authorized representative)

Name

Common Seal of Company
.....

Note:

1. For the purpose of executing the Deed of Joint Undertaking, the non-judicial stamp papers of appropriate value shall be purchased in the name of executant(s).
2. The Undertaking shall be signed on all the pages by the authorised representatives of each of the partners and should invariably be witnessed.
3. This Deed of Joint Undertaking duly certified by the Company Secretary shall be submitted alongwith the bid. Further, the Deed of Joint Undertaking attested by Notary Public of the place(s) of the respective executant(s) or registered with the Indian Embassy/High Commission in that country shall be submitted by the bidder within ten (10) days from the date of intimation of post-bid discussion.
3. *Name of **Equipement** is to be inserted.
4. The Bidder may be having ongoing collaboration agreement or had collaboration agreement in the past with the collaborator / Associate.

23. FORM OF BANK GUARANTEE FOR CONTRACT PERFORMANCE (TO BE SUBMITTED BY COLLABORATOR/ASSOCIATE)

Bank Guarantee No.

Date.....

Contract No.....

.....[Name of Contract].....

To: [Name and address of the Employer/Owner]

Dear Ladies and/or Gentlemen,

We refer to the Contract ("the Contract") signed on(insert date of the Contract)..... between you and M/s (Name of Contractor), having its Principal place of business at(Address of Contractor) and Registered Office at(Registered address of Contractor) ("the Contractor") concerning (Indicate brief scope of work) for the complete execution of the (insert name of Package alongwith name of the Project).....

Whereas, the Contractor has agreed to supply the@..... #[manufactured by M/s. (Name of Manufacturer), having its Principal place of business at(Address of Manufacturer) and Registered Office at(Registered address of Manufacturer) (hereinafter referred to as the "Manufacturer") in collaboration with M/s. (Name of Collaborator/Associate), having its Principal place of business at(Address of Collaborator/Associate) and Registered Office at(Registered address of Collaborator/Associate) (hereinafter referred to as the "Collaborator /Associate"), as a pre-requisite for qualification of the Bidder/Contractor and have submitted a deed of joint undertaking declaring that they are jointly and severally bound and responsible for the successful performance of the said equipment in accordance with the Contract Specifications and that the Collaborator/Associate having agreed to furnish a Contract Performance Guarantee for the faithful performance/compliance of the Deed of Undertaking equivalent to **ten percent (10%)** of the cost of@..... to be supplied by the Manufacturer under the Contract, in addition to Contract Performance Guarantee equivalent to **ten percent (10%)** of the value of the Contract to be provided by the Contractor for the faithful performance of the entire Contract.

By this letter we, the undersigned, ...(insert name & address of the issuing bank), a Bank (or Company) organized under the laws of and having its Registered/Head Office at(insert address of registered office of the bank)..... do hereby irrevocably guarantee payment to you up to i.e., ten percent (10%) of the cost of@..... to be supplied by the Manufacturer under the Contract until ninety (90) days beyond the Defect Liability Period i.e., upto and inclusive of (dd/mm/yy).

We undertake to make payment under this Letter of Guarantee upon receipt by us of your first written demand signed by your duly authorized officer including the authorized officer of EMPLOYER declaring the Contractor/Collaborator to be in default under the Contract and without cavil or argument any sum or sums within the above named limits, without your need to prove or show grounds or reasons for your demand and without the right of the Contractor/Manufacturer/Collaborator to dispute or question such demand.

Our liability under this Letter of Guarantee shall be to pay to you whichever is the lesser of the sum so requested or the amount then guaranteed hereunder in respect of any demand duly made hereunder prior to expiry of the Letter of Guarantee, without being entitled to inquire whether or not this payment is lawfully demanded.

This letter of Guarantee shall remain in full force and shall be valid from the date of issue until ninety (90) days beyond the Defect Liability Period of the said equipment i.e. upto and inclusive of (dd/mm/yy) and shall be extended from time to time for such period (not exceeding one year), as may be desired by M/s. on whose behalf this Letter of Guarantee has been given.

Except for the documents herein specified, no other documents or other action shall be required, notwithstanding any applicable law or regulation.

Our liability under this Letter of Guarantee shall become null and void immediately upon its expiry, whether it is returned or not, and no claim may be made hereunder after such expiry or after the aggregate of the sums paid by us to you shall equal the sums guaranteed hereunder, whichever is the earlier.

All notices to be given under shall be given by registered (airmail) posts to the addressee at the address herein set out or as otherwise advised by and between the parties hereto.

We hereby agree that any part of the Contract may be amended, renewed, extended, modified, compromised, released or discharged by mutual agreement between you and the Collaborator, and this security may be exchanged or surrendered without in any way impairing or affecting our liabilities hereunder without notices to us and without the necessity for any additional endorsement, consent or guarantee by us, provided, however, that the sum guaranteed shall not be increased or decreased.

No action, event or condition which by any applicable law should operate to discharge us from liability hereunder shall have any effect and we hereby waive any right we may have to apply such law so that in all respects our liability hereunder shall be irrevocable and, except as stated herein, unconditional in all respects.

Notwithstanding anything contained herein:

1. Our liability under this Bank Guarantee shall not exceed _____ (*value in figures*) _____ [*value in words*] _____].

2. This Bank Guarantee shall be valid upto _____(validity date)_____.

3. We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only & only if we receive a written claim or demand on or before _____(validity date)_____."

For and on behalf of the Bank

[Signature of the authorised signatory(ies)]

Signature_____

Name_____

Designation_____

POA Number_____

Contact Number(s): Tel._____Mobile_____

Fax Number_____

email _____

Common Seal of the Bank_____

Witness:

Signature_____

Name_____

Address_____

Contact Number(s): Tel._____Mobile_____

email _____

Note :

1. For the purpose of executing the Bank Guarantee, the non-judicial stamp papers of appropriate value shall be purchased in the name of Bank who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be signed on all the pages by the Bank Authorities indicating their POA nos. and should invariably be witnessed.

3. The Bank Guarantee should be in accordance with the proforma as provided. However, in case the issuing bank insists for additional paragraph regarding applicability of ICC publication No: 758, the following may be added at the end of the proforma of the Bank Guarantee [*i.e., end paragraph of the Bank Guarantee preceding the signature(s) of the issuing authority(ies) of the Bank Guarantee*]:

"This Guarantee is subject to Uniform Rules for Demand Guarantee, ICC publication No. 758 except that article 15(a) is hereby excluded."

Form No. 24: Format of 'Authorization certificate issued by Domestic Manufacturer for selling Domestically Manufactured Iron & Steel Products'

(On Domestic Manufacturer's Letterhead, see GCC Clause 5.7)

To: *[Insert: name of Employer]*

Dear Ladies and/or Gentlemen,

WE*[insert: name of Domestic Manufacturer]* [hereinafter, " Domestic Manufacturer"] who are established and reputable manufacturers of *[insert: name and/or description of the Iron/Steel Product being supplied by the Domestic Manufacturer]* [hereinafter, "Iron & Steel Products"] having production facilities at*[insert: address of factory]* do hereby authorize*[insert: name & address of Contractor]* (hereinafter, the "Contractor") who has signed the Contract with you against '*.....[insert: name of package alongwith Specification Number]*' for supply of Goods manufactured using the Iron & Steel Product produced by us.

We hereby undertake that we shall supply the Iron & Steel Products to the Contractor, adhering to minimum Domestic Value Addition prescribed for the Iron & Steel Products in line with the "Policy for providing preference to Domestically Manufactured Iron & Steel Products in Government Procurement" issued by the Ministry of Steel Government of India Vide Notification dated 8th May 2017 and its revision dated 29th May 2019 including subsequent amendments/ modifications, if any.

For and on behalf of the Domestic Manufacturer

Signed: _____

Date: _____

In the capacity of*[insert: title of position or other appropriate designation]* and this should be signed by a person having the power of attorney to legal bind the Domestic manufacturer.

Date:.....

Place:.....

(Signature).....

(Printed Name).....

(Designation).....

(Common Seal).....

Note 1.

The Authorization certificate should be on the letterhead of the Domestic Manufacturer and should be signed by a person competent and having Power of Attorney to legally bind the Domestic Manufacturer.

Form No. 25: Format for Affidavit of Self Certification regarding Domestic Value Addition in Iron & Steel Products to be provided on a non-judicial stamp paper of Rs. 100/-.

Date:

I _____ S/o, _____ D/o, _____ W/o, _____ Resident of _____ hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the policy of Government of India issued vide Notification No: _____ dated 8th May 2017 and its revision dated 29th May 2019 including subsequent amendments/ modifications, if any and

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring agency (ies)/POWERGRID for the purpose of assessing the domestic value addition of Iron & Steel Products supplied by us*/supplied by us to(Name of the contractor).....* for manufacturing/supply of Goods for “.....[insert: name of package alongwith Specification Number]’.

**** Please delete whichever is not applicable***

That the domestic value addition for all inputs which constitute the said Iron & Steel products has been verified by me and I am responsible for the correctness of the claims made therein.

That in the event of the domestic value addition of the product mentioned herein is found to be incorrect and not meeting the prescribed value-addition criteria, based on the assessment of procuring agency (ies)/POWERGRID for the purpose of assessing the domestic value-addition, I will be disqualified from any Government tender for a period of 36 months. In addition, I will bear all costs of such an assessment.

That I have complied with all conditions referred to in the Notification No. _____ dated 8th May 2017 and its revision dated 29th May 2019 wherein preference to domestically manufactured iron & steel products in Government procurement is provided and that the procuring agency (ies)/POWERGRID is hereby authorized to take action in line with the provisions of the Integrity pact/ Bidding Documents. I also undertake to pay the assessment cost and pay all penalties as specified in the Bidding Document.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.

- i Name and details of the Manufacturer
(Registered Office, Manufacturing unit location, nature of legal entity)

- ii. Date on which this certificate is issued
- iii. Iron & Steel Products for which the certificate is produced
- iv. Procuring agency to whom the certificate is furnished
- v. Percentage of domestic value addition claimed and whether it meets the threshold value of domestic value addition prescribed
- vi. Name and contact details of the unit of the manufacturer (s)
- vii. Net Selling Price of the Iron & Steel products
- viii. Freight, insurance and handling till plant
- ix. List and total cost value of input steel (imported) used to manufacture the Iron & Steel products
- x. List and total cost of input steel which are domestically sourced.
- xi. Please attach value addition certificates from suppliers, if the input is not in-house.
- xii. For imported input steel, landed cost at Indian port with break-up of CIF value, duties & taxes, port handling charges and inland freight cost.

For and on behalf of..... (Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Directors)

<Insert Name, Designation and Contact No.>

Establishment of Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR)



VOLUME-II TECHNICAL SPECIFICATIONS



पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उपक्रम)

POWER GRID CORPORATION OF INDIA LIMITED

(A Government of India Enterprise)

www.powergridindia.com

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PART- A SECTION-1

INTRODUCTION AND GENERAL INFORMATION

Part- A Section 1

INTRODUCTION AND GENERAL INFORMATION

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Part- A Section 1

INTRODUCTION and GENERAL INFORMATION

The intent of this specification is to establish Centralized Supervision and Quick Fault Detection System for Communication system established for Inter State Transmission System(ISTS) and also for Intra State Transmission System in Western Region. Centralized supervision and Quick Fault Detection System for Communication system shall also be referred as Unified Network Management System (UNMS). This Volume II of the Tender Document describes the Technical specification for the following systems:

Part-A	:	General Information of the Project
Part-B	:	Technical specification of UNMS System
Part-C	:	Auxiliary Power Supply

The purpose of this Section-1 of Part A of the technical specification is to provide scope of work, overview of the project, general information about the existing systems and the proposed system under this project, requirements, responsibilities & obligations of Contractor & Employer/Owner and general bidding requirements for the project.

1.1 Indian Power Sector

The Power Sector in India is organized in five electrical regions for operation of power system namely North, South, East, West and North-east. Presently all the regions are synchronized as single block.

The exchange of power among the synchronized regions takes place through 765/400/220KV transmission lines and HVDC interconnections. The operation of the each regional grid is managed by the Regional Load Dispatch Centre (RLDC) with underlying State Load Dispatch Centre (SLDCs) and Sub-LDCs. At National level to supervise the RLDCs and to monitor the interregional power exchanges, a National Load Dispatch Centre at New Delhi is in operation. All SLDCs, RLDCs and NLDC control Centers are equipped with SCADA/EMS and WAMS systems. In addition Renewable Energy Management System (REMC) are also established in Northern Region, Southern Region and Western Region. The same are located at NLDC, RLDCs and at SLDCs of Maharashtra, Gujarat & MP in WR, AP, Karnataka and Tamil Nadu in SR and Rajasthan in NR.

Fiber Optic based Communication System for ISTS and Intra State Transmission System is in place to support voice and data communication from sub-stations/generating station to control centers and among control centers to support SCADA/EMS, WAMS and REMC System in the region.

Communication System for ISTS is established by POWERGRID as part of projects namely Unified Load Dispatch and Communication (ULDC), Microwave Replacement Projects (MRP), Fiber Optic Expansion Projects (FEP), Transmission Projects and ongoing Reliable Communication Projects. ISTS Communication is also established by POWERGRID and Private Agencies as part of Tariff Based Competitive Bidding (TBCB) Projects. Communication System for Intra-State Transmission System was also

established by POWERGRID for many States as part of ULDC, MRP and FEP projects. Presently many States have taken up upgradation/Expansion of Fiber Optic based Communication System to cater voice and data requirement for their Intra-State Transmission System.

In the Western Region, the Regional Load Dispatch Center (WRLDC) is located at Mumbai. The Constituents of Western Region are MPPTCL, GETCO, DD, DNH, CSPTCL, GOA, and Maharashtra. Their existing SLDCs are located at Jabalpur, Vadodara, Daman,,Diu RAIPUR, Margao, and Navi Mumbai respectively.

1.2 POWERGRID

POWERGRID, a Govt. of India Enterprise, a “Maharatna Company” is engaged in Power transmission business with the mandate for planning, coordination, supervision, and control over complete inter-state transmission system.

POWERGRID is responsible for the establishment and operation of inter-state EHV transmission lines, substations and communication facilities in a coordinated and efficient manner. This gigantic transmission network, spread over length and breadth of the country, is consistently maintained at an availability of over 99% through deployment of state-of-the-art Operation & Maintenance techniques which are at par with Global Standards. About 51% of total power generated in the country is wheeled through POWERGRID’s transmission network.

1.3 ISTS Communication facilities in Western Region:

ISTS Communication facilities presently available in Western Region is providing voice and data communication from Sub-stations, generating stations established under Regulated Tariff Mechanism (RTM) as well as Tariff Based Competitive Bidding (TBCB) basis under Central Sector to Western Region Load Despatch Centre (WRLDC).

Further voice and data communication from State Load Despatch Centers (SLDCs) of all constituents is also established with WRLDC to support SCADA/EMS Systems for efficient management of Western Region Grid. In addition, ISTS communication also supports voice and data communication between WRLDC and National Load Despatch Centre at New Delhi and Back-up at New Delhi.

Intra-state Communication facilities in Western Region is pertaining to voice and data communication from sub-station and generating stations within state with their respective State Load Despatch Centre (SLDC). In some states concept of Area Load Despatch Centers (Sub-LDC) is there for managing cluster of stations. Number of Area Load Despatch Centers is as per geography of concerned state. All these Sub-LDCs in turn report to SLDC for managing state level grid.

Communication facilities provided for ISTS requirements generally consist of data channels from Remote Terminal Units (RTUs)/Sub-station Automation System (SAS), Phasor Measurement Units (PMUs) at sub-stations/generating stations to Control Centers(WRLDC) and between SCADA/EMS Systems, WAMS & REMC at SLDCs, WRLDC, NRLDC and NLDC. Requirement of voice communication from Sub-station

and generating stations with Control Centers at WRLDC, SLDC and Sub-LDC and between Control Centers is also provided by ISTS and Intra-state Communication System. These facilities are also being used for providing channels for tele-protection purpose.

Communication facilities created for ISTS, and Intra-State Communication is mostly based on OPGW based Fiber Optic Communication Network with Transmission Equipment as SDH and Access equipment as PDH. Multiple proprietary Network Management Systems are provided in the Western Region for ISTS/Intra-State Communication management and are deployed for management of specific communication nodes. Some communication nodes are being managed through local craft terminal as the same are not managed by any existing NMSs.

Generally, data channels from RTUs with IEC61850-101 protocol are provided with serial communication channels of capacity 64kbps upto Control Centres (WRLDC/SLDC/Sub-LDC). New RTUs/SAS generally with IEC61850-104 protocol/gateway are provided with 10Mbps Ethernet communication channels configured as VLAN upto Control Centres. Control Centre Data exchange through ICCP Protocol is generally provided with Ethernet data channels of 10 Mbps/100 Mbps as per requirement of data volume. Details of various voice and data services provided as of now over ISTS Communication are indicated as below:

Sl. No.	Channel description	Protocol	Channel type
1	RTU to Control center	Serial	Low speed (300-1200 bps) data channel
2	RTU to Control center	104	Ethernet VLAN (10 Mbps)
3	PMU to Control center	C37.118	Ethernet VLAN (70 Mbps)
4	PMU to NTAMC	C37.118	Ethernet VLAN (10 Mbps)
5	Voice (2 Wires, 4 Wires)	Serial	64 Kbps voice channels
6	VOIP	Ethernet	Ethernet VLAN (4 Mbps)
7	EPABX Communication between Control Centers	Ethernet	Ethernet VLAN (10 Mbps)
8	Video Conferencing between Control Centers	Ethernet	Ethernet VLAN (10 Mbps)
9	NLDC main - NLDC backup	ICCP (SCADA)	P-2-P Ethernet channel (100 Mbps)
10	RLDC main - RLDC backup	ICCP (SCADA)	Ethernet VLAN (100 Mbps)
11	RLDC main/back-up - NLDC main/back-up	ICCP (SCADA)	Ethernet VLAN (100 Mbps)
12	SLDC main - SLDC backup	ICCP (SCADA)	Ethernet VLAN (100 Mbps)
13	SLDC main/back-up - RLDC main/back-up	ICCP (SCADA)	Ethernet VLAN (10 Mbps)
14	NLDC Main PDC to NLDC backup PDC	PDC	P-2-P Ethernet channel (500 Mbps)
15	RLDC PDC - NLDC PDC	PDC	Ethernet VLAN (100 Mbps)
16	RLDC PDC - SLDC PDC	PDC	Ethernet VLAN (100 Mbps)
17	Teleprotection channels	E1	2 mbps channel for each link

1.4 Existing Communication System:

1.4.1 ISTS Communication:

At present, about 22,000 Kms Fiber Optic Communication Network is in operation for ISTS. Deployed communication system is OPGW based Fiber Optic Communication System primarily with SDH as fiber optic transmission equipment & PDH as termination equipment from different makes which came up in different time frame as part of various projects. Network Management System (NMS) for SDH and PDH had also been provided as part of these systems, which are proprietary in nature.

1.4.2 Intra State Transmission System Communication:

At present about 5,000 Kms Fiber Optic Communication Network is in operation for Intra-State Transmission systems of MPPTCL, GETCO, DD, DNH, CSPTCL, GOA, and MSETCL. Deployed communication system is OPGW based Fiber Optic Communication System primarily with SDH as fiber optic transmission equipment & PDH as termination equipment from different makes which came up in different time frame as part of various projects. Network Management System (NMS) for SDH and PDH had also been provided as part of these systems, which are proprietary in nature.

Details of Existing Equipment/Upcoming Communication System are mentioned at Appendix A

1.5 Intent of the Project

This Volume II (Part A to C) of the Tender Document describes the project overview and the technical specifications for UNMS System & Auxiliary Power Supply (APS) to be procured as a part of Implementation of this Project. The intent of this Project is:

- Installation of UNMS system for Main and Back UNMS Centres for POWERGRID (RTAMC Vadodara as Main & RTAMC Nagpur as Backup) and workstation console for States at SLDCs of respective states.
- Integration of existing Network Element (NE), existing NMSs and National UNMS with Main & Backup UNMS Centers. (UNMS and UNMS center are used interchangeably in this Technical specification).
- Integration of existing NMS and NEs with new system shall not require any modification in the existing system.
- Change of setting by user or Auto adjustments specified in the specification shall not require or result in any sort of downtime/unavailability of that system to the users.
- Installation of Auxiliary Power supply system for Main and backup UNMS Centers.

The specification describes the functional and performance requirements of various components of the systems and sub-systems and maintenance & support services required from the Contractor under the aforesaid project.

The purpose of this section (Part A) of the specification is to provide overview of the Project, general information about the existing systems, the proposed system under this project, requirements, responsibilities of Contractor as well as Employer/ Owner, general bidding requirements and the scope of work.

1.6 Overview of the Proposed Systems

Under this project new UNMS system shall be established at RTAMCs of POWERGRID at Vadodara & Nagpur and SLDCs of MPPTCL, GETCO, DD, DNH, CSPTCL, GOA, and MSETCL of Western Region as per the intent given above. The new system shall integrate with the existing Communication system of ISTS and Intra-State without affecting the operation of the existing system. The system shall be designed for meeting identified functional and system expansion requirements in all respects including all hardware, software and configurations and the successful bidder shall have to demonstrate the same during Factory Acceptance Test. The operational performance of the system shall meet the Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020 requirements.

1.7 Scope of Work

The scope of work under this package shall include in complete conformity with the sections of this specifications. This includes overall Project Management having Survey, Planning, Design, Engineering, Documentation, Integration, Supply, Delivery to site, Unloading, Insurance, Storing, Handling, transportation to final locations, Installation, Termination, Testing, Demonstration for acceptance, and Commissioning of following:

- a) Supply and Installation of Main & Backup UNMS system hardware and software along with associated items at respective UNMS Centers as per specified BoQ in the TS. The new system shall be deployed in such a way that the operation of the existing systems should not be disturbed.
- b) Supply and Installation of State configuration including hardware & software for workstation, network switches, firewall & IDPS, Printer, Furniture etc.
- c) Integration of existing NMS and Network Elements (NE) with Main and Back up UNMS System. One channel of each NMS/NE to Main and Back up UNMS center shall be used for redundancy of respective UNMS Centers. The splitter required for redundant channels integration of NEs shall be in the scope of the contractor.
- d) If NBI License/NMS is not available for any NMS/NE, Bidder has to procure, at their own cost, the NBI license, NMS etc., for that particular NMS/NE, for integration in UNMS System.
- e) Development of complete Database, displays and reports either from scratch or by extracting existing database, displays and reports.

- f) Import and Adaption of database & displays made by Employer/Owner for existing NMS system including import of historical data stored in existing servers for integration in new system.
- g) Auxiliary Power Supply System Comprising of UPS with Battery set along with all necessary distribution board wherever required as per specified BoQ in TS.
- h) Integration & Testing with new EMS/NMS/NEs coming up during implementation and AMC period of this Contract.
- i) Integration & Testing with U-NMS at National level coming up during implementation and AMC period of this Contract.
- j) Technical and Commercial tie-ups with existing vendors for NMS/NEs and OEM's of U-NMS modules.
- k) Supply of Spares identified under AMC along with main items to meet the contingency during installation period and during AMC period.
- l) All cabling, wiring, and interconnections to the equipments being supplied and to be integrated including communication equipment and power supply.
- m) Integration of all the supplied equipments and existing system
- n) The contractor's scope shall include customization of its database, such as configuration of database, scan period and all other database parameters required to integrate existing system successfully.
- o) Shifting of existing system workstations and Installation of new system workstations at temporary location in parallel for intervening period.
- p) Shifting and Installation of new system in UNMS Centre. This shall include all the services including cabling, interface modification and shifting or re-shifting of system required for intervening period and for final shifting to main UNMS Centre. Re-cabling for some or all equipments as required for final shifting shall also be in the scope of supplier.
- q) Additional Hardware, software and services necessary to ensure compatibility with existing equipment.
- r) Auditing of Cyber Security implementation by CERT-In listed Auditors during AMC.
- s) Training Owner's personnel
- t) Comprehensive Maintenance of the supplied system for seven (7) years including one (1) year defect liability period as per specification including future UNMS/NMS/EMS & NE Integrations, Database configurations, Maintaining Spare inventory etc.
- u) Integration with third party Applications: The new UNMS Systems being supplied shall have provision to exchange data with the existing and or to be purchased third party applications of Employer/Owner in standard formats like ODBC, OPC & XML etc.
- v) GI/Aluminum cable trays/trace ways with covers shall be supplied by the contractor for laying cables so that cable can be protected from rodents. These cable trays/trace ways shall be screwed/ fixed on the floor by the contractor.
- w) Contractor shall supply necessary interface (Hardware and software) for sniffing/tapping the existing NMS/EMS/NEs for parallel operation of new system with existing system.

1.8 General Requirements

The Contractor is encouraged to offer standard products and designs. However, the Contractor must conform to the requirements and provide any special or additional equipment/s or software necessary to meet the requirements stated in the specification. The Employer/Owner reserves the right of execution of works within the stipulated quantity variation provision other than those indicated in the appendices at the same rates, terms and conditions.

The supplied system (hardware & software) shall comply with cyber security standard clause 14 of the Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020, Indian or International Security Standards e.g. IT and IT related elements against ISO/IEC 15408 standards, for Information Security Management System against ISO 27000 series Standards, Telecom and Telecom related elements against 3GPP security standards, 3GPP2 security standards etc. from agency/ labs identified by Government of India, All security related requirements as per Department of Telecommunication (DoT) guidelines and as amended by DoT on time-to-time basis shall be followed/complied by contractor at no additional cost to Employer/Owner till the implementation of the project. The procurement/bid proposal shall be complaint to these standards.

The contractor before supply shall certify the items for relevant cyber security standards. Certified auditors/CERT-In listed auditors for compliance to standards shall test the commissioned system under AMC. The contractor for ensuring compliance of cyber security standards shall do Vulnerability Assessment and Penetration Testing (VAPT) & all patch management for complete life cycle of the project.

It should be noted that preliminary design information and bill of quantity are minimum and indicative only; the Contractor shall verify jointly (with Employer/Owner) the design data during the site surveys & detail engineering and finalize the BoQ as required for ultimate design & system performance.

The Bidder's proposal shall address all functional and performance requirements within this specification and shall include sufficient information and supporting documentation in order to determine compliance with this specification without further necessity for enquiries. The Bidder's proposal shall clearly identify all features described in the specifications or in any supporting reference material that will not be implemented; otherwise, those features shall become binding as part of the final contract.

An analysis of the functional and performance requirements of this specification and/or site surveys, design, and engineering may lead the Contractor to conclude that additional items and services are required that are not specifically mentioned in this specification. The Contractor shall be responsible for providing at no added cost to the Employer/Owner, all such additional items and services such that a viable and fully functional UNMS System is implemented that meets or exceeds the capacity, and performance requirements specified. Such materials and services shall be considered to be within the scope of the contract.

All equipment provided shall be designed to interface with existing equipment and shall be capable of supporting all present requirements and spare capacity requirements identified in this specification.

The equipment shall be designed and provisioned for expansions and reconfigurations without impairing normal operation, including adding and removing NMS/EMS/NEs/channels & UNMS Centers. Adequate measures shall be taken to provide protection against rodents, contaminants, pollutants, water & moisture, lightning & short circuit, vibration and electro-magnetic interference etc.

The Contractor shall demonstrate a specified level of performance of the offered items during well-structured factory and field tests.

The bidders are advised to visit sites (at their own expense), prior to the submission of proposal, and make surveys and assessments as deemed necessary for proposal submission. The successful bidder (Contractor) is required to visit sites. The site visits/routes shall include all necessary surveys to allow the contractor to perform the design and implementation functions. The Contractor shall inform their site survey schedule to the Employer/Owner well in advance. The site survey schedule shall be finalized in consultation with the Employer/Owner. The Employer/Owner may be associated with the Contractor during their site survey activities.

After the site survey the Contractor shall submit to the Employer/ Owner a survey report. This report shall include at least the following items:

- a) Layout of all equipments (Server, Workstation, VPS and Auxiliary Power Supply, ACDB etc.) in the rooms and buildings as required for final and intermediate positions.
- b) Proposed routing of power, earthling, LAN cable and signal cables along with Trench size at UNMS Center Existing NE/NMS/EMS Locations
- c) Availability of Space, Air conditioning and AC/DC Power supply
- d) Proposals for new rooms/buildings/ trench/ facility modifications, if required
- e) Identify all additional items required for integration for each site/location.
- f) Existing system viz. NMS, NEs etc., whether NMSs support NBI, APIs of NEs etc.

1.8.1 Teaming Agreement of bidder with OEM

The bidder should submit JDU with respective major OEM(s) (for supply of application software modules, server hardware et.) to ensure timely Supply, Installation, Commissioning, Performance/SLA(s), Warranty & Maintenance as specified in Technical Specifications. Contractor & respective major OEM(s) of offered product(s) shall sign and submit a Teaming, which shall at least include followings:

- a) OEM(s) shall provide required skill sets to the Contractor to enable them to execute the project deliverables (Network/ System Design, Deployment (I & C), Testing, Operational Support, Future network Augmentation, New Service Deployment for customers & Contingencies situations).

- b) OEM(s) shall also provide all the requisite assistance to the Contractor for project completion, warranty & AMC.
- c) Contractor shall be fully responsible for maintaining the Performance/SLA and OEM(s) shall assure performance criteria as defined in this Technical Specifications.
- d) The OEM(s) shall provide all the know-how required to design and size the solution as per requirement as specified in Technical Specifications to the Contractor for the equipment supplied.
- e) Technical & Commercial terms and conditions shall be mutually agreed between Bidder & OEM(s) and shall form part of submitted bid agreement.
- f) Availability of Subject Matter Expertise (SME) on site from OEM shall be ensured in case Contractor is not able to resolve the problem.
 - i. A minimum number of SME(s) shall be made available for entire implementation duration till Take over by Employer/Owner. The same shall be covered contractually between Contractor & OEM(s).
 - ii. Identified SME(s) to be attached with respective contractor for the period of delivery and up to an identified milestone.
 - iii. Designated OEM(s) representative shall be available for all Project Steering committee meetings.
- g) OEM shall give an undertaking that the SLA applicable to their solution will be supportable. OEM shall give undertaking that current version of the software including updates, software patches released time to time will be supported for next 7 years excluding the contract implementation period.
- h) The OEM shall clearly define its policy of releasing major and minor version each year. The implementation shall be based on a product configuration with a clear product roadmap for the contract period.
- i) OEM shall deliver the following to Contractor for finally delivering to Employer/Owner:
 - i. Licensed copy of all OEM applications that are within the scope of implementation by Contractor.
 - ii. Licensed copy of development and runtime versions of the report writer products and other products bundled with the application.
 - iii. List and specifications of all available Application Program Interface (APIs) in each version.
 - iv. Installation for all OEM applications that are within the scope of implementation by Contractor.
 - v. Product Specifications of all OEM applications that are within the scope of implementation by Contractor.
 - vi. User Manuals (hard & soft copy)
 - vii. Functional Overview Manual
 - viii. Operations Manuals
 - ix. System Administration Manuals
 - x. Training Brochure containing details of training programs to be offered (hard & soft copy)
 - xi. Training Kit for training of Contractor/Employer personnel
 - xii. Hardware Specifications meeting the Sizing & SLA requirements

- xiii. Guaranteed response times for typical OLTP (Online Transaction Processing) and batch transactions on various configurations of the suggested hardware (if applicable).
- xiv. Product Road Map document
- xv. Warranty, Post Warranty, and Operational Support programs offered by OEM– including commercial implications, SLA and availability of local support facilities. This shall include problem resolution, application maintenance, change requests, as well as policy for upgrades and updates.

1.9 General Responsibilities and Obligations

This sub-section describes the general responsibilities and obligations of the Contractor and the Employer /Owner.

1.9.1 Responsibilities for the Implementation Plan

The contractor shall be responsible for development of detailed project implementation plan. The implementation plan and schedule shall be consistent with the implementation plan detailed in other sections & appendices of this specification. The implementation plan shall be modelled such that it provides Power Supply for the activation of UNMS System before delivering of Hardware at Site, Data base development, Commissioning of new system, shifting of new system to UNMS room etc. The Implementation plan shall include the activities of both the Contractor and the Employer/Owner, showing all key milestones such as facilities readiness and clearly identifying the nature of all information and project support expected from the Employer/Owner. In consultation with the Employer/Owner, Contractor shall finalise the detailed Implementation plan following award of the contract.

1.9.2 Contractor's Responsibilities and Obligations

The Contractor shall be responsible for all cabling and wiring associated with the equipment provided both inside and outside buildings. The Contractor shall also be responsible for determining the adequacy of the local power source for the equipment and for cabling to it, with adequate circuit protective breakers, if required. In addition, the Contractor shall be responsible for shielding equipment and cabling to eliminate potential interference to or from the equipment and for earthing of all cabinets and shields as required for system. Contractor's responsibilities include, but are not limited to, the following:

- (i) Provide a working system that meets or exceeds the functional and performance requirements of this specification without affecting the operation of the existing systems.
- (ii) Provide a complete turnkey implementation and assume responsibility for all integration and implementation issues in order to deliver an operable system.
- (iii) To ensure the completion of the entire implementation within the scheduled time frame as mentioned in the tender fulfilling the entire tender terms and conditions.
- (iv) Site visits and studies necessary to identify and provide all equipment needed to implement U-NMS.
- (v) Development of installation and safety guidelines and procedures for the mechanical installation including testing and documentation.
- (vi) Equipment engineering and design specific to each location including review of, and conformance with local environmental and earthing considerations.

- (vii) All cabling wiring including supply, laying and termination of cables (signal, power supply & earthing), DC/AC distribution boards.
- (viii) Configure all features and functionalities in the network as indicated by the Employer/Owner during detail Engineering and implementation.
- (ix) Buying and maintaining of spares identified under AMC along with main items to meet the contingency during installation and Maintenance period.
- (x) Project management, project scheduling, including periodic project reports documenting progress during the contract period.
- (xi) Engineering and technical assistance during the contract warranty and maintenance period.
- (xii) Provide all additional Equipment and services necessary to ensure compatibility between new and existing equipment.
- (xiii) Implement all minor civil works and identify any major civil works i.e. expansion or construction of rooms, trenches necessary for installation of proposed equipment and provide the details of such work to the Employer/Owner.
- (xiv) Define source power requirements for each cabinet/ rack of equipment provided.
- (xv) Supply, installation, testing and commissioning of all hardware, software, and firmware required to satisfy the requirements of this Specification.
- (xvi) Factory and site testing of all hardware and software provided.
- (xvii) Provide Type Test report to the Employer/Owner and if required, conduct type test.
- (xviii) Integration of existing equipment and with other planned equipment being procured by Employer/Owner in future. Contractor is responsible for integrating the complete system i.e. upcoming/future network equipment also.
- (xix) Provide a Quality Assurance Plan and access to the manufacturing process.
- (xx) Shipment of all equipment to designated locations and/or storing areas.
- (xxi) Storing, maintenance of storing area and security including full responsibility for protection from theft and fire for all the items to be supplied.
- (xxii) All documentation and drawings as specified.
- (xxiii) All required spare parts, maintenance aids, and test equipment.
- (xxiv) Planning and implementation for a smooth integration with existing operations to new network operations on U-NMS Platform including new equipment/applications, wherever applicable with minimum downtime. However, maintenance of the existing system will be responsibility of owner.
- (xxv) After successful deployment of UNMS system, all data from Excel sheets and disparate sources shall be migrated to proposed UNMS system so that operations team can work efficiently.
- (xxvi) Tie up with existing communication system provider for providing necessary system information of existing OEMs of Communication system for getting required information for seamless integration with U-NMS system as per requirements mentioned in different sections of Technical Specification.
- (xxvii) Training of the Employer/owner's personnel.

- (xxviii) Hardware, software, and firmware maintenance, debugging, and support of the equipment through final acceptance, and maintenance on all new equipment as per specifications.
- (xxix) Full system backup of all installed software for all machines.
- (xxx) Availability of service, spare and expansion parts for the supplied items for the complete design life i.e. 7 years from the operational acceptance of the system of the project as per details in various parts of this specification.
- (xxxi) Compliance of all applicable security related requirements as per latest DoT guidelines with subsequent amendments.
- (xxxii) Mandatory Testing and Certification of Telecom Equipment (MTCTE)' under the provision of Indian Telegraph (Amendment) Rules 2007 shall apply on all equipment to be supplied under subject Package. Contractor has to supply only certified equipment as per MTCTE. Please refer the weblink <https://www.mtcte.tec.gov.in> for more details.
- (xxxiii) The Contractor shall ensure following at their own cost,
- “Any imported equipment/material/item/parts/component to be supplied under the contract shall be tested in the certified laboratories to check for any kind of embedded malware/trojans/cyber threats and for adherence to Indian Standards as per the directions issued by Ministry of Power/Govt. of India from time to time. In case of such import from specified “prior reference” countries, the requirement of prior permission from the Govt. of India including protocol for testing in certified and designated laboratories by Ministry of Power/Govt. Of India”.
- (xxxiv) All equipment/ material/ items, as applicable under the present scope of works, shall be procured and supplied from domestic manufacturers.

S. No	Telecom Products, Services and Works	Year
		2019-20 onwards
		LC
1	Encryption/UTM platforms (TDM and IP)	65
2	IP/MPLS Core routers/ Edge/ Enterprise Router	60
3	Managed Leased line Network equipment	60
4	Ethernet Switches (L2 and L3) , Hubs	60
5	IP based Soft Switches, IMS, Unified Communication Systems	60
6	Wireless/Wireline PABXs / IP PBX & / Media Gateways	65
7	CPE (including Wi-Fi Access points and Routers, Media Converters), 2G/3G/4G/LTE Modems, Leased-line Modems, NFV/SDN CPE	50
8	Set-Top Boxes	55
9	SDH/Carrier-Ethernet/MPLS- TP/ Packet Optical Transport equipment/ PTN/ OTN systems	65
10	DWDM/CWDM systems	60
11	GPON / XGS-PON, NG-PON2 equipment (including ONT and OLT)	60
12	Optical/SDH/PDH Cross Connects/ OTN Cross-connects and optical MUX,OADM	60
13	Small size 2G/3G GSM based Base Station Systems, with its various derivatives including rural & disaster response, Macro & Micro BTS, Small Cells, NIB, C-RAN BBU and RRH	60
14	2G/3G GSM based Base Station Systems, with its various derivatives including rural & disaster response, Macro & Micro BTS, Small cells, NIB, C-RAN BBU and RRH	60

15	<i>Small Size LTE/LTE-R Based Mobile Systems with its various derivatives including rural & disaster communications, Macro & Micro eNodeB, Small Cells, EPC, NIB C-RAN BBU and RRH ,LTE/LTE-R/4.5 G/ 5 G based broadband wireless access systems (eNodeB, gNB, EPC. etc.)</i>	60
16	<i>LTE(LTE-R Based Mobile Systems, with its various derivatives including rural & disaster communications, Macro & Micro eNodeB. Small cells, EPC, NIB C-RAN BBU and RRH ,LTE/LTE-R/4.5 G/ 5 G based broadband wireless access systems (eNodeB, gNB, EPC, etc.)</i>	50
17	<i>Wi-Fi based broadband wireless access systems(Including Access Point, Aggregation Block, Core Block), Integrated Broadband system)</i>	55
18	<i>Microwave Radio systems (IP/Hybrid), Mobile Front haul BBU and RRH (CPRI, eCPRI, FlexE, RoE, NGFI)</i>	55
19	<i>Software Defined Radio, Cognitive Radio systems</i>	55
20	<i>Repeaters (RF/RF-over-Optical), IBS, and Distributed Antenna system</i>	60
21	<i>Satellite based systems —Hubs, VSAT Disaster Communication Systems etc.</i>	40
22	<i>Copper access systems (DSL/DSLAM), high-speed xDSL G. fast)</i>	55
23	<i>Network Management systems (NMS) with its various derivatives</i>	65
24	<i>Security and Surveillance Communication Systems (video and sensors based) including Perimeter Security Systems</i>	40
25	<i>Optical Fiber</i>	50
26	<i>Optical Fiber Cable</i>	55
27	<i>Telecom Power System (Including Solar Power)</i>	55
28	<i>Telecom Batteries (Lead Acid & Li-ion)</i>	55
29	<i>IP audio phones / IP video Phones / Analog adaptor</i>	40
30	<i>SDN Software Controllers. NVF and CNF software</i>	55
31	<i>Telecom Cloud infrastructure, Telecom Data centers</i>	40
32	<i>2 way Analog/Digital radio including Walkie-Talkie & Mobile Radio</i>	55
33	<i>Batteries of 2 way Analog/Digital radio including Walkie-Talkie</i>	45
34	<i>Fiber Monitoring System</i>	55
35	<i>M2M/IOT Subsystems</i>	55
36	<i>Telecom Services/Works</i>	70

Detailed descriptions of the Contractor's responsibilities, in relation to individual items and services offered, are delineated in other sections of this specification.

1.9.3 Exclusions from contractor's Scope:

The contractor shall be responsible for providing all the hardware & software, development of database and services required for commissioning of the project except

- Buildings
- Air conditioning
- Firefighting system
- A.C. input power supply
- Communication System
- Auxiliary Power Supply for locations where it is not included in the BOQs.

1.9.4 The Employer/ Owner's Responsibilities and Obligations

The Employer/Owner will provide the following items and services as part of this Project:

- Overall project management

- (ii) Providing infrastructure like building, Air-conditioning, DG set etc. for installation of U-NMS.
- (iii) AC Source power at (nominal) 230 volts, except power supply included in the scope of this Project.
- (iv) Providing bandwidth for network connectivity.
- (v) Review and approval of the Contractor's designs, drawings, and recommendations.
- (vi) Communication system network and device data
- (vii) Communication network configuration data, including:
 - a. Channel assignments for data
 - b. Interconnection drawings for existing equipment
- (viii) Review and approval of test procedures.
- (ix) Participation in and approval of "Type", factory and site acceptance tests.
- (x) Review and approval of training plans.
- (xi) Providing support and access to facilities at the sites.
- (xii) Implement the major civil works such as expansions or construction of rooms, trenches etc. as required for the equipment to be provided by the Contractor.
- (xiii) Coordination of the Contractor's activities with the Employer's/Owner's concerned departments and Owner.
- (xiv) Provide to the extent possible drawings for existing sites and facilities for which equipment installations are planned.
- (xv) Arranging appropriate shut down, as required, to facilitate erection testing and commissioning of System.
- (xvi) Approval of key personnel/ Project Manager/ resident Engineer at Site for the project.
- (xvii) Any statutory clearance/ entry permits as required.

1.10 System Architecture

The conceptual system architecture of Main and Backup UNMS Centres of UNMS system & the Seven (7) SLDCs i.e. Servers, devices and their interconnection at various Control Centres is provided in relevant appendices of the Technical Specification. The Contractor can optimise and propose their own system architecture but shall meet functional requirement as well as future expandability, redundancy and the isolation required for cyber security.

1.11 Main and Backup UNMS Centre Operational Philosophy

This specification document states the requirements for the UNMS systems, which the Contractor shall install at RTAMCs of POWERGRID at Vadodara and Nagpur and SLDCs of MPPTCL, GETCO, DD, DNH, CSPTCL, GOA, and Maharashtra. of the Western Region. Apart from the number of workstations/servers associated with each system, the UNMS configurations shall be identical at main & back-up UNMS centres. The requirements stated in this document for "The UNMS", unless expressly indicated otherwise, shall apply equally to the UNMS Systems. Each UNMS system shall be able to serve as a backup to the

other system. In normal course, Main UNMS Centre shall be performing all the functions of Main UNMS Centre and Backup UNMS Centre shall be functioning as standby to Main UNMS Centre. Main UNMS Centre shall update the Backup UNMS Centre automatically. Main UNMS Centre shall be primary UNMS Centre for operations at all times, when available. The update/backup periodicity of data at Backup UNMS Centre from Main UNMS Centre shall be as follow:

- Real time data shall be updated every 10 second.
- ISR data shall be updated every hour.

In case of failure of the Main UNMS Centre, the Backup UNMS Centre shall take over operations and functions of Main UNMS Centre. When Main UNMS Centre recovers from failure, Backup UNMS Centre shall update all data, including ISR data, at Main UNMS Centre. The takeover of main UNMS Centre functions by Backup UNMS Centre shall require manual intervention.

Each UNMS system shall be configured to communicate with the entire set of NMS/EMS/NEs of Western Region and shall have the database and full set of displays & reports for the region.

1.12 General Bidding Requirements

The Bidder shall be responsive to the Employer's/Owner's technical requirements as set forth in this specification. To be considered responsive, the Bidder's proposal shall include the following:

- a) The Technical Proposal including the documents listed in the **Table 1-1: Bid Documents Checklist** shall be provided in the bid,
- b) A detailed project implementation plan and schedule that is consistent with Employer's specified objectives. The plan shall include the activities of both the Contractor and Employer/Owner, show all key milestones, and clearly identify the nature of all information and project support to be provided by Employer/Owner.
- c) A System description Document describing the overview of bidder's proposed Software and Hardware System.
- d) A commitment and a clearly defined plan to develop a system support organization, based in India and capable of providing a full range of local services (including software and hardware maintenance and upgrade support) for the life of the delivered UNMS systems.
- e) The integration plan detailing the minimum space and logistics requirement at existing control Centre, parallel operation of the existing system without disturbing the operation of the existing system, Expected downtime in existing system, dismantling of the existing system and shifting the operation to the new system.

Table 1-1

Bid Documents Checklist

S.No	Description:	Enclosure	Reference
1.	Completed Data Requirement Sheets (As per relevant appendices of the Technical Specification)	Page no.	Ref no.
2.	System description Document	Page No.	Ref. No
3.	Schematic Diagram of Proposed System Configuration	Page no.	Ref no.
4.	Quality Assurance Program (As per relevant Sections of Technical Specs Volume II)	Page no.	Ref no.
5.	Detailed Project Implementation Plan (As per relevant Sections of Technical Specs Volume II)	Page no.	Ref no.
6.	Answers to Questionnaire relevant appendices of the Technical Specification	Page No.	Ref No.
7.	Teaming agreement with OEM	Page No.	Ref No.
8.	Methodology/ Approach for development of database and displays for proposed UNMS System for using Programmable Development System (PDS)	Page No.	Ref No.
9.	Methodology for Computation of Service/Channel/Link availability in regional/state network	Page No.	Ref No.

1.13 Organization of the Volume II Document

This Volume II shall consist of three parts as follows:

- A - General information of the project
- B - Technical specifications
- C - Auxiliary Power Supply

Appendices

1.14 Applicable Standards

The applicable standards are mentioned in the respective technical section. The offered equipment shall conform to the standards mentioned in the specification except to the extent modified by this specification. In case of any discrepancy between the description given in the specification and the standards the provisions of the technical specification shall be followed unless specifically agreed to during bidding process.

The available equivalent Indian Standard shall be complied and in absence of Indian standards the following standards and codes shall be generally applicable to the equipment and works supplied under this Contract, wherever applicable:

1. TMF-513 Data Information Model
2. TMF-814 - CORBA based NML-EML Interface
3. TMF-864 - MTOSI/XML based NML-EML Interface
4. TMF – 854
5. TMF-MTNM 3.5
6. TMF-MTOSI 4.0
7. SNMPv2 / SNMPv3 Interface
8. SID v13 (Shared Information Model)

9. IETF MIB II - RFC 1213 (Interface and IP Address)
10. IETF MPLS - RFC 4221 (LSR, LDP, TE STD MIBS)
11. IETF Entity MIB RFC 4133 (Chassis/Card)
12. ETF RFC 2922– LLDP MIB
13. ITU-T G.707 based SDH Multiplexing hierarchy to be handled as part of Inventory Model
14. ITU-T G.709 based WDM/OTN Multiplexing hierarchy to be handled as part of Inventory Model
15. ITU-T G.7041 based GFP /EoSDH to be handled as part of Inventory Model
16. ITU-T G.7042 based LCAS /EoSDH to be handled as part of Inventory Model
17. ITU-T G.841 based SDH Protection mechanisms to be handled as part of Inventory Model & Impact analysis
18. TEC GR No: TEC GR No TEC/GR/I/ESI-001/03/MAR12 for Mid-Tier Storage.
19. TEC GR No. TEC/GR/I/ESI-001/03/MAR12 for SAN Switches
20. TEC-GR No: GR/LSW-01/04 MAR-11 for LAN Switches
21. TEC GR no. GR/FWS-01/02 SEP 2006 for Firewall
22. TEC GR no. GR/IPS-01/01 NOV 2006 for IPS
23. The ITU-T TMN model and components
24. ITU-T standard M.3000, M.3010, M.3599
25. U-NMS/J Standards
26. OSI and ITU-T X.73x series System Management Function (SMF) standards and recommendations
27. ITU-T X.730, X.731, X.732, X.733 & X.736
28. ISO 27001 standards
29. ITIL v3 standard / eTOM standard
30. ISO/IEC 15408 standards wherever applicable
31. BS 25999 and ISO 22301 for DC-DR
32. Clause 14 of the CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020
33. DoT latest guidelines
34. North Bound Interface Compliant

Specifications and codes shall be the latest version, inclusive of revisions, which are in force. Where new specifications, codes, and revisions are issued during the period of the contract, the Contractor shall attempt to comply with such, provided that no additional expenses are charged to Employer/ Owner.

In the event the Contractor offers to supply material and/or equipment in compliance to any standard other than those listed herein, the Contractor shall provide, salient characteristics of the proposed standard for comparison. The Employer/Owner will assess the merit of material/equipment and will be sole judge as to their acceptance.

-----**End of the Section**-----

PART- A SECTION-2

PROJECT MANAGEMENT, QUALITY ASSURANCE, TRAINING AND DOCUMENTATION

PART- A SECTION-2

PROJECT MANAGEMENT, QUALITY ASSURANCE, TRAINING AND DOCUMENTATION

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PART- A SECTION-2

PROJECT MANAGEMENT, QUALITY ASSURANCE, TRAINING AND DOCUMENTATION

This section describes the project management, schedule, quality assurance, and training and documentation requirements for the project.

2.1 Project Management

The Contractor shall assign a Project Manager with the authority to make commitments and decisions that are binding on the Contractor. Employer/Owner will designate a Project Manager to coordinate all Employer/Owner project activities. All communications between Employer/Owner and the Contractor shall be coordinated through the project managers. The project managers shall also be responsible for all communications between other members of the project staffs including sub contractor, if any.

Minimum Qualifications of the project manager shall be B.E. /B.Tech in ECE/CS Engineering/MCA with PMP certification /MBA. PM should possess at least 10 years of experience in similar works, out of which at least 5 years should be in Project Management area.

2.2 Project Schedule

Completion schedule of the project is 20 months from the date award of contract agreement. Based upon this the bidder shall submit a preliminary project implementation schedule along with the bid. The detail project implementation schedule shall be submitted by the Contractor after award for Employer's/Owner's approval, which shall include at least the following activities:

- (a) Site Survey including owner location Make, Model, Software version of NMS, Year of installation etc.
- (b) Documents, DRS, Drawing submission and approval
 - a. UNMS system Database and display development, Commencement and Completion
 - b. System overview document.
 - c. Display and report formats such as Real Time, Historian etc.
 - d. FAT, Cyber Audit, SAT, SAVT Procedure submission and approval
 - e. UNMS Center layout diagram including firewall, remote console, system deployment and cyber security.
- (c) Hardware and software purchases, development/manufacturing and integration
- (d) Factory Acceptance Testing commencement and completion.
- (e) Dispatch Schedule

- (f) Receipt, Storage, Installation & Field update schedule
- (g) Integration of all supplied UNMS subsystems
- (h) Testing at Site/UNMS Center for integrating with existing NEs and NMS/EMS
- (i) Data of NE(Network Element) and NMS/EMS export and integration with UNMS SYSTEM(with near zero Downtime)
- (j) Training schedule
- (k) Commissioning of entire system, SAT and GSAT of the system -commencement and completion

The project implementation schedule shall include the estimated period for completion and its linkage with other activities. The Project implementation schedule shall also contain Employer/Owner activities required for the Contractor to complete the system.

2.3 Progress Report

A progress report shall be prepared by the Contractor each month against the activities listed in the project schedule. The report shall be made available to Employer/Owner on a monthly basis, e.g., the 10th of each month. The progress report shall include all the completed, ongoing and scheduled activities and transmittals issued and received for the month.

2.4 Transmittals

Every document, letter, progress report, change order, and any other written transmissions exchanged between the Contractor and Employer/Owner shall be assigned a unique transmittal number. The Contractor shall maintain a correspondence index and assign transmittal numbers consecutively for all Contractor documents. Employer/Owner will maintain a similar correspondence numbering scheme identifying documents and correspondence that Employer/Owner initiates.

2.5 Review Meetings

Progress meetings shall be scheduled by the Project Manager and attended by the Contractor and Employer/Owner each reporting period to review progress of the project. Progress meetings shall be used to review the progress report, written correspondence exchanged since the last meeting, and open action items.

The Contractor shall also attend technical meetings as required to discuss technical aspects of the project and to review Employer/Owner comments on approval documents. When appropriate, these technical meetings shall be conducted as extensions to the progress meetings.

2.6 Testing

This section describes general requirement applicable to all type of system/ equipments being supplied under the project. The system/equipment specific requirements are given in respective

parts of the specifications.

2.6.1 Quality Assurance & Testing

All materials and parts of the system/sub-system to be supplied under the project shall be of current manufacture from a supplier regularly engaged in the production of such equipment/System.

The Contractor shall adhere to a Quality Assurance (QA) program for the preparation of all Contract deliverables, including documentation, hardware, firmware and software. The program shall provide for early detection of actual or potential deficiencies, timely and effective corrective action, and a method of traceability of all such deficiencies.

The Employer/Owner or his duly authorized representatives reserve the right to carry out Quality Audit and Quality Surveillance of the systems and procedures of the Contractor/his vendor's Quality Management and UNMS Activities

2.6.2 Quality Assurance and Quality Control Program

The Contractor shall maintain a Quality Assurance/Quality Control (QA/QC) program that provides that equipment, materials and services under this specification whether manufactured, designed or performed within the Contractor's plant, in the field, or at any sub-contractor source shall be controlled at all points necessary to assure conformance to contractual requirements. The program shall provide for prevention and ready detection of discrepancies and for timely and positive corrective action. The Contractor shall make objective evidence of quality conformance readily available to the Employer/Owner. Instructions and records for quality assurance shall be controlled and maintained at the system levels. The Contractor shall describe his QA/QC program in the Technical Proposal, (along with samples from his QA/QC manual) and shall submit his QA/QC Manual for review and acceptance by the Employer/Owner.

Such QA/QC program shall be outlined by the Contractor and shall be finally accepted by Employer/Owner after discussions before the award of Contract. A Quality Assurance Program of the Contractor shall generally cover but not be limited to the following:

- (a) The organization structure for the management and implementation of the proposed Quality Assurance Program.
- (b) Documentation control system.
- (c) Qualification data for key personnel.
- (d) The procedure for purchase of materials, parts/components and selection of sub-contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases, etc.
- (e) System for shop manufacturing including process controls.
- (f) Control of non-conforming items and system for corrective action.
- (g) Control of calibration and testing of measuring and testing equipments.

- (h) Inspection and test procedure for manufacture.
- (i) System for indication and appraisal of inspection status.
- (j) System for quality audits.
- (k) System for authorizing release of manufactured product.
- (l) System for maintenance of records.
- (m) System for handling, storage and delivery.
- (n) A Quality Plan detailing out the specific quality control procedure adopted for controlling the quality characteristics of the product.

The Quality Plan shall be mutually discussed and approved by the Employer/Owner after incorporating necessary corrections by the Contractor as may be required.

Neither the enforcement of QA/QC procedures nor the correction of work mandated by those procedures shall be cause for an excusable delay. An effective Quality Assurance and Quality Control organization shall be maintained by the Contractor for at least the duration of this Contract. The personnel performing QA/QC functions shall have well-defined responsibility, authority, and organizational freedom to identify and evaluate quality problems and to initiate, recommend, or provide solutions during all phases of the Contract. The QA/QC organization of the Contractor shall be an independent administrative and functional structure reporting via its manager to the Contractor's top management. The QA/QC manager(s) shall have the authority within the delegated areas of responsibility to resolve all matters pertaining to quality to the satisfaction of Employer/Owner when actual quality deviates from that stated in the Work Statement.

The Contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of Employer/Owner's inspection of equipment/materials.

The Employer/Owner or his duly authorized representative reserves the right to carry out Quality Audit and Quality Surveillance of the systems and procedures of the Contractor's/his vendor's Quality Management and Control Activities.

The scope of the duties of the Employer/Owner, pursuant to the Contract, will include but not be limited to the following:

- (a) Review of all the Contractor's drawings, engineering data etc.
- (b) Witness or authorize his representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the Contract.
- (c) Inspect, accept or reject any equipment, material and work under the Contract in accordance with the specifications.
- (d) Issue certificate of acceptance and/or progressive payment and final payment certificate
- (e) Review and suggest modification and improvement in completion schedules from time to time; and
- (f) Monitor the Quality Assurance program implementation at all stages of the works.

2.6.3 Inspection Certificate and Cyber Security.

The Contractor shall give the Employer/Owner two weeks in case of domestic supplies and six weeks in case of foreign supplies written notice of any material being ready for testing. Such tests shall be to the Contractor's account except for the expenses of the Inspector. The Employer/Owner, unless witnessing of the tests is waived, will attend such tests on the scheduled date for which Employer/Owner has been so notified or on a mutually agreed alternative date. If Employer/Owner fails to attend the testing on the mutually agreed date, Contractor may proceed with the test which shall be deemed to have been made in the Inspector's presence and Contractor shall forthwith forward to the Inspector, duly certified copies of the test results in triplicate.

The Employer/Owner shall, within fourteen (14) days from the date of inspection as defined herein, give notice in writing to the Contractor of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the Contract. The Contractor shall give due consideration to such objections and shall make the modifications that may be necessary to meet said objections. When the factory tests have been completed successfully at the Contractor's or Sub-contractor's works, the Employer/Owner shall issue a certificate to this effect within fourteen (14) days after completion of tests but if the tests are not witnessed by the Employer/Owner, the certificate shall be issued within fourteen (14) days of receipt of the Contractor's Test Certificate by the Employer/Owner. The completion of these tests or the issue of the certificates shall not bind the Employer/Owner to accept the equipment should it, on further tests after erection, be found not to comply with the Contract.

In cases where the Contract provides for tests, whether at the premises or works of the Contractor or of any Sub-contractor, the Contractor except where otherwise specified shall provide free of charge items such as labour, materials, electricity, fuel, water stores, apparatus and instruments, as may be reasonably demanded by the Employer/Owner or his authorized representative to carry out effectively such tests of the equipment in accordance with the Contract and shall provide facilities to the Employer/Owner or his authorized representative to accomplish testing.

The inspection by Employer/Owner and issue of Inspection Certificate thereon, shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed Quality Assurance Program forming a part of the Contract.

The Contractor shall keep the Employer/Owner informed in advance of the time of starting of the progress of manufacture of material in its various stages so that arrangements can be made for inspection.

Record of routine test reports shall be maintained by the Contractor at his works for periodic inspection by the Employer/Owner's representative.

Certificates of manufacturing tests shall be maintained by the Contractor and produced for verification as and when desired by the Employer/Owner. No material shall be dispatched from its point of manufacture until it has been satisfactorily inspected and tested. Testing shall always be carried out while the inspection may be waived off by the Employer/Owner in writing only.

However, such inspection by the Employer/Owner's representative(s) shall not relieve the Contractor from the responsibility for furnishing material, software, and equipment to conform

to the requirements of the Contract; nor invalidate any claim which the Employer/Owner may make because of defective or unsatisfactory material, software or equipment.

Cyber security certificate shall be submitted inline with requirement as Section 1 and as per latest DOT/MOP circular related cyber security as applicable.

2.6.4 Inspection and Test

All materials furnished and all work performed under this Specification shall be inspected and tested. Deliverables shall not be shipped until all required inspections and tests have been completed, all deficiencies have been corrected to Employer/Owner's satisfaction, and the equipment has been approved for shipment by Employer/Owner.

Should any inspections or tests indicate that specific hardware, software or documentation does not meet the Specification requirements, the appropriate items shall be replaced, upgraded, or added by the Contractor as necessary to correct the noted deficiencies. After correction of a deficiency, all necessary retests shall be performed to verify the effectiveness of the corrective action.

The test shall be considered complete when

- (a) when all variances have been resolved
- (b) all the test records have been submitted
- (c) Employer/Owner acknowledges in writing the successful completion of the test.

2.6.4.1 Inspection

Access to the Contractor's facilities while manufacturing/Developing and testing are taking place, and to any facility where hardware/software is being produced for Employer/Owner shall be available to Employer/Owner representatives. The Contractor shall provide to Employer/Owner representatives sufficient facilities, equipment, and documentation necessary to complete all inspections and to verify that the equipment is being fabricated and maintained in accordance with the Specification. Inspection rights shall apply to the Contractor's facilities and to subcontractor facilities where equipment is being manufactured.

Inspections will be performed by Employer/Owner, which will include visual examination of hardware, enclosure cable dressings, and equipment and cable labeling. Contractor documentation will also be examined to verify that it adequately identifies and describes all wiring, hardware and spare parts. Access to inspect the Contractor's hardware/Software quality assurance standards, procedures, and records that are applicable to the facilities shall be provided to Employer/Owner.

2.6.4.2 Test Plans & Procedures

Test plans for both factory and field tests shall be provided by the Contractor to ensure that each test is comprehensive and verifies all the features of the equipment are tested. The test plans for factory and field tests shall be submitted for Employer/Owner approval before the start of testing.

The contractor shall prepare detail testing procedure in line to specification and submit for Employer/Owner's approval. The procedure shall be modular to the extent possible, which shall

facilitate the completion of the testing in the least possible time.

2.6.4.3 Test Records

The complete record of all factory and field acceptance tests results shall be maintained by the Contractor. The records shall be maintained in a logical form and shall contain all the relevant information. The test reports shall be signed by the testing engineer and the engineer witnessing the tests.

2.6.4.4 Reporting of variances

A variance report shall be prepared by either Employer/Owner or Contractor personnel each time a deviation from specification requirements is detected during inspection or testing. All such variances shall be closed in mutually agreed manner.

However, at any stage if Employer/Owner feels that quality of variances calls for suspension of the testing the testing shall be halted till satisfactory resolution of variances, which may involve retesting also.

2.6.5 Factory Test

The factory tests shall be conducted on all the equipments and shall include, but not be limited to the following, appropriate to the equipment being tested:

- (a) Verification of all functional characteristics and requirements specified
- (b) Inspection and verification of all construction, wiring, labeling, documentation and completeness of the hardware

Before the start of factory testing, the Contractor shall verify that all changes applicable to the equipment have been implemented. As a part of the factory tests, unstructured testing shall be performed to allow Employer/Owner representatives to verify proper operation of the equipment under conditions not specifically tested in the above structured performance test. The Contractor's test representative shall be present, and the Contractor's technical staff members shall be available for consultation with Employer/Owner personnel during unstructured test periods. All special test facilities used during the structured performance test shall be made available for Employer/Owner's use during unstructured testing.

2.6.6 Field Performance Test

After the equipment has been installed, the Contractor shall start up and check the performance of the equipment of field/ UNMS center locations. All hardware shall be aligned and adjusted, interfaces to all inputs and outputs installed, operation verified, and all test readings recorded in accordance with the Contractor's recommended procedures. The field performance test shall exhibit generally all functions of the system. All variances must be corrected prior to the start of the field performance test. The list of final tests to be carried out in the field shall be listed in the site-testing document.

2.7 Documentation

To ensure that the proposed systems conform to the specific provisions and general intent of the Specification, the Contractor shall submit documentation describing the systems to

Employer/Owner for review and approval. Further the Contractor shall also submit the drawings/documents for all the hardware & software required for site installation, testing and commissioning and thereafter operation of the system. The Contractor shall obtain approval of Employer/Owner for the relevant document at each stage before proceeding for purchase, manufacturing, system development, factory testing, erection, site testing, training etc.

Each document shall be identified by a Contractor document number, the Employer/Owner document number, and the Employer/Owner purchase order number. Where a document is revised for any reason, each revision shall be indicated by a number, date, and description in a revision block along with an indication of official approval by the Contractor's project manager. Each revision of a document shall highlight all changes made since the previous revision.

The Contractor shall submit two hard copies of each document/drawing for Employer/Owner's review and approval along with soft copy with each submission. After approval two set of all the documents shall be submitted as final documentation. Any changes observed during field implementation shall be incorporated in the as-build drawing and required sets of same shall be submitted to Employer/Owner. Other than above hard copies all other documentation should be used in electronic form in searchable, printable formats (preferably pdf).

- (a) Documentation Plan
- (b) Documentation Identification Plan
- (c) System Description Documents (Overview)
- (d) Functional Cross Reference Document
- (e) Site Survey format requiring details such as owner, location, Make, Model, Software version of NMS, Year of installation etc
- (f) Data Requirement sheets
- (g) FAT, Cyber Audit, SAT, SAVT- Procedures.
- (h) System overview document
- (i) UNMS Center layout diagram including firewall, remote console, system deployment and cyber security, secured zoning.
- (j) Display and report formats such as Real Time, Historian, web etc.
- (k) Software Design Document
- (l) Data base Documents
- (m) Drawings/Documents for manufacturing/Assembly of the equipment/system
- (n) Drawings/Documents for installation of the equipment/system at site/Control room
- (o) Software description/design documents for each module
- (p) Factory Test report
- (q) Manuals for each equipment
- (r) System Configuration Parameter Details
- (s) Site Testing documents
- (t) Training documents

- (u) System Administrator Documents
- (v) User guide for Despatcher
- (w) Software Licences for supplied systems (e.g SA, SF, Historian, MS Office etc.)
- (x) Battery sizing calculations and power consumption requirement of supplied system
- (y) Cable sizing calculations
- (z) Inventory of the hardware
- (aa) Panel General and Internal Arrangement drawing indicating modules, components location etc.
- (bb) Installation drawing.
- (cc) Schematic drawing.
- (dd) External cable laying & termination schedule details
- (ee) Communication Channel Plan
- (ff) Firewall and security setup check list
- (gg) FDS-Functional Design Document
- (hh) Undertaking as per specification for cyber security compliance.
- (ii) IP for cyber security compliance and submit plan for complete system.
- (jj) UNMS Center Hardware layout drawings.
- (kk) Inventory of NE(cards, port, make etc location) and EMS/NMS (Technology, make, location, model, etc)
- (ll) Services-E1, Ethernet, VLAN etc.
- (mm) Link Details Network Diagram.
- (nn) Cyber security implementation methodology

The Contractor shall also supply two sets of User manuals, O&M manuals and manufacturer's catalogues for all the hardware & software supplied under the contract one set each of which shall be at all the locations where the System has been installed. The user manual shall at minimum include the principle of operation, block diagrams, troubleshooting and diagnostic and maintenance procedures. Considering all the components of the project briefly the following documents/drawings shall be required under the project. It is not acceptable to supply user manuals of systems, functions and applications as it exists. The user manuals shall be oriented towards system users and system deployed.

The documentation pertaining to third party or OEM products may be supplied in the format as available from the third party/OEM. The documents to be submitted shall include the following information:

2.7.1 Software Inventory

An inventory of all software shall be maintained by the Contractor. The Contractor shall submit the following inventory lists: the preliminary inventory list at the time of the FDS approval, an updated inventory list immediately prior to the start of the FAT, and the final inventory list at the time of system commissioning. The inventory shall include the name of each program, a cross

reference to pertinent Contractor documents, language and libraries used, and an indication of whether the program is to be standard, modified, or custom.

2.7.2 Functional Description

Functional description documentation shall be provided for each function of supplied system. It shall include the following information for each function:

- (a) Introduction describing the purpose of the function with references to other documentation to aid the reader's understanding of the functions performed.
- (b) Performance requirements that describe the execution periodicity and the tuning parameters that control or limit the capabilities of the software.
- (c) Complete description of the operation, data and logic interfaces with other functions.
- (d) Sample displays where applicable.
- (e) Description of APIs being used for different subsystems under UNMS SYSTEM for interfacing/Integrating other systems such as ERP/IT/ICCP etc.
- (f) Functional Description of software adapters for NE/(Network elements)
- (g) Functional description and integration of EMS/NMS with UNMS system.

2.7.3 Software Design

Software design documentation shall be provided for each function, at least three months before the Factory Acceptance Test. It shall include detailed descriptions of the following items:

- (a) The overall organization and structure of the software logic such as a breakout of the software into software modules.
- (b) Mathematical algorithms and formulae.
- (c) Complete description of the algorithms, operation and the data and logic interfaces with other functions.
- (d) Data dictionary in which the following (as applicable) information for each data item in tables, file, and array is provided: (1) Name (2) Purpose, (3) Location, (4) Length of data item, and (5) Initialization.
- (e) Databases internal and external to the software, along with a description of all inputs required and the output produced by the software modules.
- (f) Interfaces with other software modules.
- (g) Design limitations such as field length and the maximum quantity of data items that can be processed.
- (h) Processor loading and memory size used.
- (i) API- Application Programmable Interface.
- (h) Functional Description of software adapters for NE (Network elements)
- (j) Functional Description and integration of EMS/NMS with UNMS system.

2.7.4 Database Documentation

Database documentation shall describe the structure of the database. The documentation shall define the individual elements (files, records, fields, and tables) and their interrelationships. Portions of the database developed specifically for Employer/Owner's systems shall be identified.

Documentation shall also be provided that instructs the user in the preparation of data to be used for the databases, including:

- (a) The overall organization of input records
- (b) The format of each data record
- (c) Each data field and the valid entries pertaining to the fields.

Sufficient database documentation shall be provided to enable the database to be updated or regenerated when inputs are changed and added, programs are modified, and new programs are added. Database access documentation shall be supplied such that software developed by Employer/Owner may use the same access tools used by the Contractor-supplied software.

2.7.5 User Documentation for operators/users.

User documentation for users shall contain detailed operating instructions and procedures. Information in the documentation shall be presented in terms that are meaningful to dispatchers. Each system function of this Specification and all other functions designed for users shall be included in this documentation.

Instructions and procedures shall be explained step-by-step with an explanation of how each step is performed, which parameters can be adjusted, and the effects obtained by varying each parameter. Additionally, the user documentation shall describe:

- (a) All user guidance and error messages, along with the steps necessary to recover from errors
- (b) The user interface including displays and keyboard operations used to control and review input to and output produced by the function. All displays relevant to the function shall be included along with a description of each dynamic display field.
- (c) Alarms and messages issued by the function and the conditions under which they are generated
- (d) Procedures to be followed as a result of computer system restarts, failures, and failovers.
- (e) Main & backup UNMS Centre Switch Over

Dispatcher documentation shall be customized separately for Owner's system of main and Backup and shall be based on the delivered systems. It is not acceptable to describe the Contractor's standard system and then identify differences between the standard and delivered systems. The documentation shall not include standard or other descriptions that do not apply to the delivered systems.

2.7.6 System Administration Documentation

System administration documentation shall be provided to guide Employer/Owner personnel in the operation and procedures required to generate and update the systems, including system software, database, application software, and other elements of the systems. System administration documents shall be provided for the following items:

- (a) Software management
- (b) Network communications management
- (c) Processor memory/ Resource configuration
- (d) System performance monitoring
- (e) System restart/failover management and diagnostic procedures
- (f) System generation and management
- (g) Database generation and management
- (h) Display generation and management
- (i) Report generation and management
- (j) Diagnostic programs and how to Run.
- (k) Software utilities
- (l) Software maintenance
- (m) Application software parameters and tuning guides
- (n) Other Contractor-supplied system software not included above.
- (o) Switch Over from Main to backup UNMS center.
- (p) Firewall configuration and settings.
- (q) Centralised Intrusion protection configuration.
- (r) Centralised configuration Management.
- (s) System Integration document

2.7.7 System Functional Description Document

The document shall include an overview of the system configuration. This document shall be designed Users will include POWERGRID/State Utility operating personnel communication support staff and maintenance personnel.to serve as a complete introduction to the supplied system. The document shall be oriented to the Employer/Owner (user's) point of view and be subject to the Employer/Owner's review and approval.

2.7.8 System Documentation

A detailed documentation plan and document submission schedule shall be prepared and submitted for approval within one (1) week of the Contract Award.

2.7.9 Supplementary Documentation

If during the training courses or while performing maintenance on such equipment during the warranty period, the Employer/Owner determines that additional information is required to perform the maintenance function, the Contractor and/or its subcontractors shall provide the specific supplemental information necessary to perform the maintenance function. This information shall be documented in a form suitable for incorporation into the appropriate maintenance document.

2.7.10 Test Documentation

Documentation for all factory, field, and availability tests that apply to Owner's system shall be provided in accordance with the requirements defined in Section 5. The Contractor shall also provide documentation for all factory, Site and GSAT tests.

The test documentation shall include the following:

- (a) Test Procedure
- (b) Test Reports
- (c) Justification for results of test

2.7.11 Drawing and Document Approval Procedure

The drawings/documents submitted by the Contractor shall be reviewed by the Employer/Owner within the practicable duration and shall be modified by the Contractor if any modifications and/or corrections are required by the Employer/Owner in compliance with the Specifications. The Contractor shall incorporate such modifications and/or corrections and submit the final drawings/documents for approval. Any delays arising out of failure by the Contractor to rectify the drawings/documents in good time shall not alter the contract completions date.

The drawings/documents submitted for approval to the Employer/Owner shall be in duplicate. One print of such drawings shall be returned to the Contractor by the Employer/Owner marked with one of the categories as listed below: -

Category	Inference
Cat I	Approved/Released for implementation.
Cat II	Approved/Released for implementation subject to incorporation of comments. Revised drawing required.
Cat III	To be resubmitted for approval after incorporating comments.
Cat IV	For information and record.

The approval of the drawing/document conveyed vide above marked copy shall neither relieve the Contractor of its contractual obligations and its responsibilities towards weights, qualities, design details, assembly fits, performance particulars and conformity of supplies with the Indian Statutory Laws as may be applicable, nor shall it limit Employer/Owner's right under the contract.

Depending upon the category of approval the Contractor shall resubmit the

drawings/documents for review by Employer/Owner after incorporating all corrections.

Further work by the Contractor shall be strictly in accordance with the Cat-I, Cat-II or Cat-IV approved drawings and no deviation shall be permitted without the written approval of the Employer/Owner.

All manufacturing and fabrication work in connection with the equipment/material prior to the approval of the drawings shall be at the Contractor's risk. The Contractor may make any changes in the design which are necessary to make the equipment/material conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Employer/Owner. Approval of Contractor's drawing or work by the Employer/Owner shall not relieve the Contractor of any of his responsibilities and liabilities under the Contract.

2.7.12 Final Documentation

Final documentation shall consist of the documents approved in Cat I and Cat IV listed in the relevant Section. The documents will be used by the Employer/Owner personnel for operating and maintaining the equipment after acceptance.

Until acceptance of the equipment by the Employer/Owner, the Contractor shall be responsible for supplying documentation revisions or changes necessitated by inaccuracies, installation requirements, omissions determined by usage, and design or production alterations to the equipment. All changes shall be issued in the form of replacements for the affected drawings, diagrams, charts, graphs, tables, lists, and pages in the various documentation such that all documentation describes the equipment "as delivered".

Two (2) sets of final approved documentation shall be provided for each UMS Server Location (Main and Backup) and one set for the Engineering office of the Employer/Owner.

For all other documents, two (2) sets of the final approved documentation shall be provided for the engineering office of the Employer/Owner.

All final Contractor-supplied documentation shall be easily reproducible by the Employer/Owner.

In addition to the paper prints required above, two (2) soft copies of all final approved documentation shall be provided on CD-ROMs/ Hard Disk/Drive.

The soft copy of this documentation shall be supplied on an internationally reputed format, preferably in MS Office. The electronic copies of the standard unmodified drawings & documents such as equipment manuals and proprietary drawings and documents may also be provided in Acrobat Reader or equivalent format, however the project engineering related drawings & documents shall be in editable format.

2.8 Training

This section describes the project requirements for training Owner's personnel

- (a) Training shall be conducted by Contractor personnel who are experienced instructors and speak understandable English/Hindi.
- (b) All necessary training material shall be provided by the Contractor. Each trainee shall receive individual copies of all technical manuals and all other documents used for training.
- (c) Class materials, including the documents provided to the trainees as well as class handouts, shall become the property of Owner and Employer/Owner. Employer/Owner and Owner reserves the right to copy such materials, but for in-house training and use only.
- (d) Hands-on training shall be with equipment identical to that being supplied to the Employer/Owner. In general training duration shall be 50% for hands on training.
- (e) For all training courses the travel (e.g., airfare) and daily expenses will be borne by the Owner.
- (f) Hands on training and Classroom Training shall be organised at Contractors place.
- (g) The Contractor shall quote training prices in LOT as per BPS/BOQ.
- (h) The schedule, location, detailed contents and batches for training for each course shall be finalised during detail engineering. The number of participants in the training program may undergo change.

The training courses, their duration, and the number of Owner's personnel to be trained in each course are identified in Table 2-1. Further requirement for training has been identified in other sections also of this Technical Specification.

2.8.1 Training Requirement for UNMS System

The training course requirements are described below in terms of the contents of each course to be provided. Training for the complete UNMS SYSTEM (Hardware and software) shall be provided for Computer System Hardware, Service Fulfilment, Service assurance, Reporting & Dash Boarding System, Incident Management System and Web Portal, supplied UNMS system database for the application software course, database, display building and Auxiliary Power Supply System etc.

A tentative training schedule for a specified duration is described below:

Table 2-1

Sl. No.	Training Course	No. of Trainees each constituent wise								Duration for each batch (In Days)	Total Man Days
		MPPTCL	GETCO	DD	DNH	CHATTISGARH	MAHARASHTRA	GOA	POWERGRID		
1.	HARDWARE										
	Computer System Hardware ○ System Overview ○ Generic Requirement ○ Features to manage resources such as Reliability, Scalability, Performance and Backup Restore ○ System Overview ● Type of Application Services(SA, SF, etc) ● System Configuration on	4	4	4	4	4	4	4	12	2	80

	Configuration Management Server • Product Overview and Manuals ○ About all components supplied under project such as Video Wall system (VWS), Networking Equipment's etc Auxiliary Power Supply Training										
2.		Application									

A. Service Fulfilment Components ○ Service Fulfillment Features ○ All Fulfillment Components ○ Network Discovery & Inventory Management ● Planning & Expansion Criteria ● System Architecture & Design ● Application Services ● Product Overview and Manuals ● Design, Assign, Activation/Provisioning of services e.g, E1,Ethernet, VLAN etc, end to end. ● Configuration and Re-Engineering	4	4	4	4	4	4	4	12	6	240
B. Service Assurance Components ○ All Assurance Components and its features ○ RCA, Service Impact Analysis & Network Impact Analysis ○ Product Overview and Manuals ● Performance Management ● Performance Management Report Generation ● Analytics Training- resetting periodically with updated inputs										

- Integration with other offline/online system from other system with UNMS - Integration of new NE/EMS with UNMS system C. Reporting & Dash Boarding System, Incident Management System and Web Portal - Report Generation - Display Making for all the Modules - Historian Server Module- report generation - Trouble Shooting - Standard Method of Procedure - Advanced Trouble Shooting - System Maintenance of supplied system - Application Maintenance - Database Maintenance - Platform Maintenance - Installation on ICCP for RTU link up/down/ - Testing the New NMS /EMS before onlining U-NMS Test										



Bench/ Server. • Escalation & Support Matrix • Cyber Security and its implementation ○ Seeing Threat ○ Identifying Malicious attack ○ Web Portal ○ Trouble Ticket Generation ○ Maintenance/Outage Management ○ Incident reporting. ○ Audit and compliance										

The Contractor shall provide training in a timely manner that is appropriate to the overall project schedule. All training courses shall be available to the Employer/Owner for a minimum of five years after final acceptance of the UNMS SYSTEM. The training courses shall be scheduled so that an individual trainee could attend every course.

The Contractor shall take the above requirements into account in developing the preliminary training schedule. Contractor shall develop a final training schedule in consultation with the Employer/Owner after contract award.

2.8.2 Training Manuals and Equipment

The Contractor shall prepare training manuals and submit them to the Employer/Owner for review at least one month prior to the start of classroom instruction. The training manuals shall be prepared specifically for use as training aids; reference manuals, maintenance manuals, and user's manuals may be used as supplementary training material. Principal documents used for training shall be tailored to reflect all the Employer/Owner specified requirements.

Each course participant shall receive individual copies (hard and soft) of training manuals and other pertinent material. The Employer/Owner shall retain a master and two additional copies of all training manuals and materials as reference documentation. A complete set of instructor's manuals and training aids shall also be provided.

Upon completion of each course, Instructor's Manuals, Training Manuals, and Training aids shall become the property of the Employer/Owner. As part of the delivered system documentation and the final documentation, the Contractor shall supply the Employer/Owner with all changes and revisions to the training manuals and other training documentation. The Employer/Owner reserves the right to copy all training manuals and aids and class material/handouts for use in the Employer/Owner-conducted training courses.

The Contractor shall furnish for use during training courses all special tools, equipment, training aids and any other materials required to train course participants.

2.8.3 Specialization Certificates

The trainees shall undergo performance evaluation tests during the courses. The Contractor is required to provide certificates to individual trainees, providing the list of activities for which he/she has been trained.

-----**End of Section**-----

PART- A SECTION-3

MAINTENANCE SERVICES

PART- A SECTION-3

MAINTENANCE SERVICES

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PART- A SECTION-3

MAINTENANCE SERVICES

3.1 Introduction

This section defines the terms and conditions for maintenance services support during and after defect liability period for the U-NMS System under this package.

3.2 Scope

The scope of work under maintenance services includes management & assisted operations, support services, preventive maintenance and breakdown/curative maintenance including spare management, repair/ replacement of all the equipment/modules/cards etc. being supplied under this Package.

3.3 Duration of Maintenance Services

The maintenance services shall be carried out during Defect Liability Period and for a period of Six (6) years after the end of the defect liability period.

3.4 Philosophy of Maintenance Services

The underlying philosophy of the maintenance services is to maintain availability of UNMS system for smooth functioning of communication network under all conditions with timely and prompt attendance to faults. The availability of all supplied system & modules/software applications of UNMS system shall be maintained which in turn shall be used to maintain inventory, availability, performance monitoring, provisioning & reporting of various data and voice services provided in cross border, inter region, regional and state level communication network, backbone and access links etc. as defined the specification.

The Contractor's engineer shall carry out the first level of network management and maintenance. The problem related to specific transport NMS/EMS shall be escalated to the respective OEM maintenance engineers. U-NMS Contractor's engineers will perform all the maintenance activities to meet the performance parameters, as specified in relevant Appendix, of Communication network in coordination with respective OEM engineers. The maintenance services shall include but not limited to the following:

3.4.1 General Requirement for maintenance

The support functions shall include but are not limited to the following:

- i. Network Operations & Management Activities –Operations and management of the supplied U-NMS system covering all the hardware and software, application for functions covering Performance Management, Security Management, Configuration Management, Faults Management, Inventory Management, web services and various applications etc. and integrated operations of the network.
- ii. Handling of all the minor, major and critical problems of the U-NMS system for resolution, their repair and restoration.
- iii. Submission of Performance and other network related reports to the Employer/Owner.
- iv. Operational Training including On Job training to the Employer's/Owner's engineers
- v. Technical assistance/support of the network including 24 x 7 remote assistance, On-line Assistance, On-site Support etc.

- vi. Preventive maintenance activities (Monthly/Quarterly/half yearly/annually) from network operating centers with status reviews and reports.
- vii. All other functions & activities required to be undertaken for successful operations of the network and meeting the performance parameters as stipulated in the specification.
- viii. Support for maintaining employer's/Owner's network and utility.
- ix. Integration of NEs/NMSs during the AMC period.
- x. Support for integrating system as mentioned in the scope.

3.4.2 Management of U-NMS Services

1. Contractor shall be responsible for carrying out Operation and Maintenance of the U-NMS Applications being supplied under this contract to ensure the supplied system availability as per the specification during the contract.
2. This includes services extended during & post defect liability period, to maintain 99.9% up time, for the U-NMS Application Software Solution/System.
 - i. Contractor team as an organization should be in a state of readiness to resolve an issue affecting the system uptime/availability, in an emergency.
 - ii. Contractor shall extend support to the Employer/Owner maintenance personnel proactively to identify potential roadblocks that could impact the system, if not addressed.
 - iii. Contractor team shall be supporting the Employer/Owner for trouble shooting of issues/downtime of Application for bringing up the application with minimum down time.

3.4.3 Resource Deployment , Management & Escalation:

Contractor shall deploy qualified and well trained human resources at Employer's/Owner's UNMS centres located in the following manner:

3.4.3.1. At UNMS Center:

- i. **L1 Support:**
 - o The support personnel (1 no. in each shift) shall be available round the clock (in 3 shifts) at Employer's/Owner's Main UNMS Centre on 24X7 basis 365 Days.
 - o One person at all state control center 365 days from 9:00 am to 6:00 pm.
 - o One person shall be deployed at Employer's/Owner's Backup UNMS center 365 days from 9:00 am to 6:00 pm.

In the event of Backup UNMS center take over as Main UNMS center due to major breakdown, resource deployment at backup UNMS center shall be ensured in line with main UNMS center.
- ii. **L2 Support:** In addition to the shift personnel at Main UNMS center, at least one engineer with following qualification & experience shall be available from 9:00 am to 6:00 pm on working days i.e. Monday through Saturday (excluding Sundays and maximum 12 days declared holidays) but must be available on call on 24X7 basis to attend to faults/ contingencies on holidays and after office hours.
 - a. Infrastructure expert (Server, Storage, OS, Database & Hardware) with adequate qualification (Minimum B.E./B.Tech or MCA and Infrastructure

- or Database certification) and experience (minimum 2 years of hands-on experience in managing system infra for similar operations).
- b. Business Software Application Expert with adequate qualification (Minimum B.E./B.Tech or MCA) and experience (minimum 2 years of hands-on experience of application software management of similar nature).
- iii. **L3 Support:** Contractor shall identify common panel of experts that will provide online support in critical conditions. In case of Remote operation/Online Support authorization from Employer/Owner should be taken by the contractor and contractor must comply to relevant cyber security standards for Remote operation/Online Support for resolution of the problem in the system. Visit of expert team may also be required during critical conditions.

3.4.3.2. Human Resource Management & Escalation:

- i. The resource envisaged by the Employer/Owner in minimum. However, Contractor shall suitably assess the resource requirement to meet the performance requirement as stipulated in the specifications and shall deploy additional resources, if need be.
- ii. Contractor shall submit CVs of the proposed maintenance engineers & experts for deployment at UNMS Centers and state control center, clearly stating their qualifications, experience and competency including courses successfully completed in the relevant fields separately to the Employer/Owner for review & approval, well before deployment. The Contractor is required to replace their engineers immediately whenever the Employer/Owner on the grounds of their performance and / or behavior requests the same during execution of duties etc.
- iii. The Contractor shall keep a strict check on the attendance of their shift engineers at Employer's/Owner's UNMS center and state control center to ensure their presence. The records shall be made available to the Employer/Owner on demand.
- iv. The Contractor shall make alternate arrangements when their shift engineers fall sick or proceed on leave, except for short duration (less than or equal to two days) during emergencies. However, the absence of their Engineers at any of the locations shall not relieve the Contractor to meet the required performance parameters stipulated under this specification.
- v. The Contractor shall submit escalation procedure/ personnel contact details for reporting problems till its resolution.

3.4.4 Maintenance

The Contractor shall perform audit of the U-NMS system and Applications (preferably in the 3rd Quarter of every year) and the report shall be submitted to the Employer/Owner within fifteen (15) days. The network audit shall include but are not limited to the following:

- Performance audit
- Software vulnerability assessment
- System/Cyber security audit as per latest MoP/DoT order/Guidelines
- Hardware Resources Utilization

Based on the outcome of the audit, Contractor's experts may undertake necessary steps need to access and study the Communication network. The detailed audit format shall be submitted for approval during detailed engineering.

3.4.4.1. Preventive Maintenance, Updates & Upgrades:

The Contractor shall submit a detailed plan of Scope, schedule and formats for Preventive maintenance for Employer's/Owner's approval during detail engineering.

- i. The Contractor shall do the regular monitoring of U-NMS related issues on 24X7 basis and shall take prompt action upon noticing any defect/fault in the system and restore it back to normal with minimal delay. This shall include organizing, coordinating, and undertaking necessary site visits for repair / replacement of faulty equipment/cards/modules etc. of supplied system by the contractor's engineers.
- ii. The Contractor shall rectify any errors that substantially degrades the performance of the product or materially restricts the Employer's/Owner's business.
- iii. The Contractor shall supply and install the new Software Upgrade Releases(both minor & major), Software Updates and/or Service Packs for U-NMS system including Operating System and latest versions as generally made available by the Contractor from time to time during the entire period of this maintenance services. The updates shall be installed only after they have been duly verified and tested in the lab against crashes & vulnerabilities. The installation of new releases shall not hamper the functioning of the operational network. All software updates & upgrades shall be in the scope AMC services.
 - a. **"Software Update"** shall mean the program improvement and rectification, provided by the Supplier in accordance with the Purchaser's malfunction report against Specification of the related Software Release or by the Supplier initiatively. It will be used to fix the bugs or provide the patches for the Software provided as per the Contract/functionalities.
 - b. **"Software Upgrade"** shall mean the fundamental improvement, which increases the function and/or enhances the capacity or performance based on retaining the original designed purpose of the program provided by the Supplier as to the Software Release.
- iv. Changes/upgrade/Update in U-NMS application software due to update/upgrade in EMS/NMS application/database software version shall also be provided by contractor without any financial implications to POWERGRID. The EMS/NMS software upgrade/update shall be verified by the U-NMS contractor in lab environment using test server & applications instances as factored in BoQ, in coordination with respective OEM/Vendors within stipulated time approved by the Employer/Owner. The updates/upgrades shall be deployed only after U-NMS contractor has verified the same. The U-NMS contractor shall carry out necessary changes if required due to update/upgrade of underlying EMS/NMS.

3.4.4.2. Planned Maintenance Activities

Following is the list of minimum planned/Scheduled maintenance activities to be carried out by the Contractor:

S.No.	Activity	Description	Frequency
1	Application Server Storage Review	Application Server partitions storage (SAN) to be reviewed and purging of the old data to improve the storage space.	Once in a Month

2	Application Data Base Review	Application Data Base performance w.r.t. the table size, slow queries to be reviewed	Once in a Month
3	Historian/ Web server/ Application/ any other server installed	Performance as per Appendix to be reviewed	Once in a Month
4	Hardware resource management	Memory loading, Processor usage etc.	Quarterly

The above list is the minimum list of schedules maintenance activities. The contractor shall submit the report of above activities to respective network UNMS centers.

3.4.4.3. Routine maintenance activities

The Contractor shall undertake the following routine maintenance activities on the network and submit the report as given below;

S. No.	Activity	Frequency
1	Network operations	Daily
2	Fault rectification	Daily
3	U-NMS system/ data backup	Daily
4	Incident Management Reports	Daily
5	Network utilization reports	Monthly
6	MIS report	Monthly
7	Inventory Reconciliation	Quarterly
8	Change Management Report	Yearly
9	Analytics/Prediction Report	Monthly
10	Outage Management & Planned Maintenance report	Monthly
11	Web user login Report	Monthly
12	Display generation Report	Monthly
13	Historian report Generation	Monthly
14	Various Data and voice service Availability Reports	Daily

The above list is the minimum list of routine maintenance activities. The contractor shall submit the report of above activities to respective network UNMS centers. The details of routine maintenance activity shall be finalized with operations before start of AMC period.

3.4.5 Documentation & Reports:

- 1) Contractor shall submit maintenance philosophy document which will be submitted for approval during detail engineering.
- 2) The Contractor shall submit the fortnightly, quarterly and consolidated annual Performance Reports indicating routine and specific jobs done to the concerned UNMS centers. The reports shall also include the recommendations for improvement and strengthening of the operations and management process/procedures, constraints, if any.
- 3) The Contractor shall submit the consolidated monthly report of incident reports to the respective Engineer-in-Charge of the Regional and State UNMS Center. The report shall have two sections for each incident.
 - i. Faults which have not been resolved within the stipulated performance criteria limit and
 - ii. Faults which have been resolved within the stipulated performance criteria limits.
- 4) The incident report, shall be duly signed by representative of Contractor and Employer/Owner, shall contain the following information:
 - i. Fault details: Nature of fault, date & time of occurrence of the fault, time of reporting (either noticed by the Contractors' maintenance engineer or

- verbal/written communication from Employer/Owner), date & time of access to the equipment at site and date & time of rectification of fault.
- ii. Details of contractor's spares consumed, if any. Details of faulty item/card/module & replaced item/card/modules, source/ store/location it was sourced from etc.
 - iii. Details related to analysis like identification of fault, method of rectification carried out and further course of action including repair of card etc.
 - iv. Any other relevant information
 - v. Recommendations for eliminating the repeat of similar faults in future.
 - vi. Unauthorized login attempt report
 - vii. Latest patch and software upgrade report.
- 5) Any other report/Document as finalized during detail engineering.

3.4.6 Spares Management

1. Contractor shall maintain its own inventory of requisite no. of all types of spares required for meeting the U-NMS Application availability requirements as per the specifications.
2. Contractor shall undertake appropriate planning for the storage of spares at strategic locations/ store depots on its own to meet the performance criteria.
3. Contractor shall submit a location wise list of spare items being maintained by them, indicating the total number of such items required to meet the performance criteria as stipulated in the specifications. However, minimum requirement list does not absolve the Contractor in meeting performance requirement under this maintenance services agreement due to non-availability of spares. Contractor shall on its own increase the spare items above the minimum list, if the situation demands so, to meet the performance parameters.
4. Contractor shall submit spares reconciliation statement every quarter to the Employer/Owner
5. All repair management related activities shall be handled through the designated Repair Management Centre and/or Technical Assistance Centre.

3.4.7 Performance Requirement

1. Definitions:
 - i. **Service Window:** "Service Window" means the service coverage hours for the system/component. In case of a service window of 24X7, the calls shall be serviced round the clock. Critical calls (Service affecting) shall be attended on priority.
 - ii. Reporting Month and Measurement Period:
 - a. "Reporting Month" is the month in which the SLAs for the Measurement Period will be reported.
 - b. "Measurement Period" is the period of twelve calendar months ending with the last day of the month immediately preceding the Reporting Month.
 - iii. **Scheduled Hours:** "Scheduled Hours" means the aggregate number of hours in the given reporting period during which the supported infrastructure elements and applications have to be available for use by the designated users.
 - iv. **Total Downtime:** "Total Downtime" means, out of the Scheduled Hours, the aggregate number of hours in the reporting period during which the supported infrastructure elements and applications were unavailable for use by the designated users.

- v. **Planned Downtime:** “Planned Downtime” means the aggregate number of hours out of the Scheduled Hours in any reporting period during which the supported infrastructure elements and applications were unavailable for use by the designated users due to preventive maintenance or upgrades.
- vi. **Excusable Downtime:** “Excusable Downtime” refers to the total downtime attributable to reasons mentioned below & shall be excluded for calculation of outage/degradation of links:
 - a. Outage/degradation not attributable to U-NMS system fault like fiber outage/degradation, AC power supply failure.
 - b. Outage due to force majeure like Fire (excluding due to bad design, quality of material or poor workmanship in subject project), earthquake, riots, floods, storms, curfew, imposition of emergency etc.
- vii. **Availability:** “Availability” refers to the percentage calculated through the following formula:

$$\text{Availability per quarter yearly (per site)} = \frac{\text{THQ} - (\text{S1} \times 1 + \text{S2} \times 0.8 + \text{S3} \times 0.5)}{\text{THQ}} \times 100\%$$

Where,

THQ is total hours in the quarter

S1 is the total non-available hours in Severity Level-1 in the quarter.

S2 is the total non-available hours in Severity Level-2 in the quarter.

S3 is the total non-available hours in Severity Level -3 in the quarter.

- viii. **Response Time:** “Response Time” refers to the time taken by the helpdesk to log and acknowledge the incident. The medium for acknowledging the incident shall be email.
 - ix. **Resolution Time:** “Resolution Time” means the time taken to resolve the incident or to provide an acceptable work around for the incident.
2. **Severity Level:** Severity Level” means the degree of impact that an incident can have on the UNMS system. The following Severity Levels are applicable for Network, Server, and Database Infrastructure Management Services etc.

Severity Levels

Category	Definition
Severity 1 – Urgent	Complete system failure, severe system instability, loss or failure of any major subsystem or system component such as to cause a significant adverse impact to system availability, performance, or operational capability (as described at 3.4.8)

Category	Definition
Severity 2 – Serious	Online Editing of Historian Data base and U-NMS Network without failover and re-start, Video Wall system (VWS) functionality, Degradation of services or critical functions such as to negatively impact system operation. Failure of any redundant system component such that the normal redundancy is lost (as described at 3.4.8) Non-availability of spares
Severity 3 – Minor	Any other system defect, failure, or unexpected operation (as described at 3.4.8)
Severity 4 – General/Technical Help	Request for information, technical configuration assistance, “how to” guidance, and enhancement requests (as described at 3.4.8).

- Under this maintenance services, the Contractor is expected to meet certain performance criteria against which their services shall be measured and failure to meet the same will attract penalties. The Contractor will maintain his own maintenance spares and other adequate resources at strategic locations to meet the performance criteria. All other expenses of the field engineers, (i.e. accommodation, tours and travel, per diem etc.), inventory of spares and services shall be included in the scope of AMC. The Contractor shall meet the following performance criteria under the maintenance services agreement of this contract.
- All faults that leads to system’s inability to manage the Employer’s/Owner’s Communication Network, corruption of system data bases, trouble notification, loss of access to the system, performance as per required performance parameters or any other faults/ criticalities that affect the services, traffic, operations & maintenance activities, management of the network etc. shall be handled with utmost urgency regardless of time of day or day of the week. Above should be applicable for item supplied by the U-NMS contractor.
- The existence of protection arrangements or other network management sites shall neither be treated as restoration/ rectification of the fault by the Contractor nor shall it relieve the contractor to meet the performance parameters of these specifications.
- The incident reports shall be generated upon notice of any fault in the network, U-NMS applications, traffic/NMS affected, planned outage of equipment, facilities availed for testing, element performance degrade, system availability degrade, preventive maintenance, system expansion etc.
- Total restoration time shall be calculated as the time from notification of the fault to the restoration of the supplied U-NMS System.

3.4.8 Severity levels

The detail of the systems under different severity levels is as below:

3.4.8.1. Severity-1 (Urgent support)

This support is required when there is a complete system failure, severe system instability, the loss/ failure of any major sub-system / system or its components, which may significantly impact the system availability, performance, or operational capability at UNMS centre. Following outages/disruptions will be considered under Severity-1:

- Loss of Critical functionality as envisaged in specification due to any problem software/Hardware-related in U-NMS system.
- Cyber Security issues and Outage of complete Web system.
- Outage of both Routers and LAN Switches.
- Loss of data exchange with other computer systems or other control centres.

The representative of the contractor would immediately attend to the problem. The problem shall be attended by the contractor at the earliest, and it shall arrange all resources and take all steps to restore the data availability and functionality at the earliest.

3.4.8.2. Severity-2

The support services not defined under Severity-1 are included under this category. Coverage under this severity would be outages that do not immediately cause online data loss but subsequently could result into Severity-1 category outage, loss of an important subsystem that may affect the day-to-day works and loss of archived data.

Following outages/disruptions will be considered under Severity-2:

- Failure of one Data/Historian Server, stoppage of data collections for archiving and outage of other applications not covered under severity-1 are included in this category. However, the critical functionality loss due to loss of only one component as defined here shall be treated as Severity-1.
- Failure of any redundant system component affecting the critical redundancy like loss of any one Application Processor, Router also be included in this category.
- Non-compliance of Monitoring functions.
- Non-availability of any of the database modeling tools.
- Non-functioning of complete or individual cube of Video Wall system (VWS) system.

3.4.8.3. Severity-3 (Standard support)

The support services included under this category are when the outage or loss of functionality is neither of an emergency nor priority functionalities as indicated in severity level 1 or 2 above. Problems like database reworking, failure of any one workstation, printers and integration services, database and display development during the period of contract including AMC would be covered under this Severity.

3.4.8.4. Severity-4 (General Technical Help)

Request for information, technical configuration assistance, “how to” guidance, and enhancement requests are included under this category.

3.4.9 Service Levels

3.4.9.1. Incident Service Levels (To be calculated annually):

Severity	Initial Response Time	Action Resolution Time	Action
1	30 minutes	2 hours	An urgent or emergency situation requiring continuous attention from necessary support staff until system operation is restored – may be by workaround.
2	2 Hours	12 Hours	Attempt to find a solution acceptable to Owner (dependent on reproducibility) as quickly as practical.
3	1 day	2 days	Evaluation and action plan. Resolution time is dependent on reproducibility, ability to gather data, and Owner's prioritization. Resolution may be by workaround.
4	2 days	5 days	Report on the problem/query is to be furnished.

3.4.9.2. System Availability Service levels:

The U-NMS system shall be considered as unavailable if:

- i. Any of the following U-NMS applications is unavailable from all the UNMS center's.
 - a. Discovery & Inventory Management system
 - b. Fault Management system
 - c. Performance Management System
 - d. User Security Management
 - e. reporting System
 - f. Service Provisioning
 - g. Any other critical UNM Application/Function
- ii. Failure of any of the following integrations:
 - a. Data/Information from the existing EMS/ NMS integration in the UNMS
 - b. Any Network Element integrated directly in the UNMS

3.4.9.3. Penalty Clause

In case the quarterly average availability for the U-NMS Applications & integrations fall short of stipulated criteria of 99.9%, the Contractor shall be liable to the penalty for deficit in meeting the assured availability parameters as per following:

Penalty for System Availability SLA:

Availability for each UNMS centre per quarter	Deduction as % of the apportioned price of total AMC for U-NMS portion of the contract applicable for that site (AMC price)
$\geq 99.9\%$	NIL
Less than 99.9%	Deduction of 2% of the apportioned price of the apportioned quarterly AMC for every 0.5% or part there of decrease in availability under 99.9%. (Maximum amount of deduction is limited to 100% of AMC charges)

- Penalty for not deploying/ non-availability (absence/leaves without replacement for more than three days) of man power resources at the indicated locations shall attract penalty of Rs. 10,000/- per day.
- If the resources are not deployed/ not available (including leaves) for more than 50% of time during the month then resource would be considered not available for entire month and shall attract penalty of Rs. 50,000/- per day.

3.5 Responsibility Matrix

The table in this section provides a summary definition of the roles and responsibilities of the contractor and Owner.

Legend:	●	This indicates who has primary responsibility to perform this function.
	A	This indicates who will provide assistance.

Table for Responsibility Matrix

Item	Task	Owner/ Employer	Contractor
1	Problem identification		
A	Root cause analysis to determine whether the fault is attributable to Hardware or Software.	----	●
B	Resolution of problems involving third party maintainer where there is uncertainty whether the root cause is hardware or software.	----	●
2	Software problem resolution		
A	Report problem and assist with problem identification	----	●
B	Provide or recommend corrections, temporary patches, workarounds or other fixes to system problems	----	●
C	Install and test corrections, temporary patches, workarounds or other fixes to system problems	----	●
3	Routine software support		
A	Build and maintain database, displays and reports	●	●
B	Perform system back-ups	----	●
C	Restore or reinstall software from back-ups	----	●
D	Monitor system logs	----	●
E	Maintain system logs	----	●
F	Maintain user accounts	●	A

Item	Task	Owner/ Employer	Contractor
4	Hardware problem resolution		
A	Report problem and assist with defining problem	●	●
B	Troubleshoot problem to diagnose if it is software-related or hardware-related	----	●
C	Identify failed component, replace failed components in online system using parts from spares inventory	----	●
D	Restore operation of repaired/replaced equipment	----	●
5	Hardware spare parts		
A	Manage local spares inventory	----	●
B	Replenish local spares inventory	----	●
6	Cyber security monitoring		
A	Patch Updates	----	●
B	Cyber Security Monitoring	●	●
C	Annual Audits	----	●
D	Implementation of Recommendations during Audit	----	●
E	Implementation of Monitoring and compliance manager for Critical Infrastructure Protection	●	●
F	Maintenance of Spares	----	●
G	System Repots	----	●

3.6 Other Responsibilities of the Contractor

1. If any changes in the settings are warranted in the system for improving the system/network performance, such changes may be initiated by the Contractor upon due intimation and approval of the Employer/Owner and such modifications shall be recorded in incident report register.
2. The Contractor shall ensure proper insurance coverage to their employees working under this maintenance services agreement and the Employer/Owner shall not be responsible for any eventualities thereof. The Contractor shall also obtain all necessary insurances that are mandatory as per applicable local laws.
3. Contractor may use third party ('subcontractor') support only to perform maintenance activities for the equipment procured from the third party. Contractors' use of third party ('subcontractor') shall not relieve Contractor of its obligation under this contract.
4. All incident and Performance service levels will be reported and measured on quarterly basis.

3.7 Review meetings

1. Review Meetings shall be held once every quarter of the year during the contract period to review the technical, operational, quality and any other aspects of the Services delivered through the contract.
2. The review meetings shall be attended by the representative of both the Contractor and Employer/Owner. Formal notice for the meeting shall be issued at least 7 days in advance along with agenda points.
3. The meeting agenda shall inter-alia include but not limited to the following:
 - (i) Services and network related issues.
 - (ii) Status of spares
 - (iii) Issues related to unattended faults/ problems

- (iv) Manpower issues
- (v) Operational issues
- (vi) Network/ software upgradation issues.

4. Whenever any major outage occurs in any part of the network, an emergency meeting may be called, as desired by the Employer/Owner. Outage related issues in the context of cause, correction and prevention shall be discussed in the meeting.

3.8 Cyber security System and Monitoring and compliance manager for Critical Infrastructure Protection

The Contractor shall also be responsible for monitoring of the cyber security system with cyber security perspective and implementing the monitoring and compliance manager for Critical Infrastructure Protection.

The contractor should conduct Cyber Security audit as per Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020, which state,

“ Cyber security. – (1) All users and control/UNMS centres connected to the communication system shall have robust programs in place to adequately and continuously manage cyber security risks that could have adversely impact power system communications infrastructure.

(2) The cyber security program shall address the following, namely: -

- (a) compliance with provisions of the Information Technology Act, 2000 (21 of 2000) and National Cyber Security Policy, 2013 as amended from time to time;
- (b) implementation of the National Critical Information Infrastructure Protection Centre (NCIIPC) Guidelines;
- (c) implementation of guidelines and advisories issued by Computer Emergency Response Team (CERT– India) and applicable Sectoral Computer Emergency Response Team (CERT); and
- (d) compliance to the Central Electricity Authority (Cyber Security) Regulations, as and when they come into force.”

The logs of the system shall be analysed for exceptions and the possible incident of intrusion/trespass shall be informed to the Employer/Owner.

The monitoring shall encompass the various cyber security devices installed at UNMS Centres such as firewalls, Intrusion prevention system (both network based and host based), routers etc. The Centralised Monitoring Console (CMC) shall monitor and continuously collect the above logs.

The contractor shall carry out the Annual Security Audit from CERT-In Certified auditors at its own cost for the complete systems under this project and implement the recommendation given by auditor in consultation with the owner. There shall not be any separate charges for supply and integration of the Hardware/Software as per the recommendation of “Cyber Security Auditor” to ensure cyber security of the supplied system.

3.9 Patch Management

The contractor shall also be responsible for providing updates/patches for the software products supplied under the project. All other patches of third-party product like Operating System and Anti-virus shall be tested by the Contractor prior to installing in the supplied system. Subsystems/ Devices like IPS, Network IPS, Host based IPS, Firewalls shall also be provided with secure patch management.

The contractor shall upgrade the various applications delivered under the project through patch management and version upgrade to make it compliant with IEC standards as envisaged under the specification throughout the AMC period.

A secure patch management and deployment system is to be established which shall be provided with single point of Internet connectivity. All the patches shall be downloaded through this single point of connection.

Patches shall be downloaded from authentic sources in patch management server that is available in DMZ zone. After successful downloading it shall be transferred to patch management server in PDS Lan, where all the patches will be tested. After successful testing of the patches, it shall be distributed to the entire system.

Automated patch management tools shall be provided to facilitate the distributions of relevant patches to the entire system. Patches should be applied to all the devices & software delivered in the project. The contractor shall also be responsible for providing updates/patches for all the software products supplied under the project for the entire period of the contract.

The Contractor shall provide a mechanism for patch management so that it is known that what patches have been applied and what all patches are pending but available with System.

Updated patches shall be applied in the system within 2 months from its release. Non-compliance will be considered under severity-2.

-----**End of the Section**-----

VOLUME II PART-B

TECHNICAL SPECIFICATION

CONTENTS

VOLUME II PART-B: TECHNICAL SPECIFICATION

This Part B of Volume-II describes the technical specifications for UNMS System, to be procured as a part of this Project. The description includes requirements in respect of UNMS Center computer hardware and software, UNMS functions, user interface, testing, maintenance etc.

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SECTION 1	UNMS FUNCTIONS
SECTION 2	UNMS SYSTEM AND APPLICATIONS FUNCTION
SECTION 3	USER INTERFACE REQUIREMENTS
SECTION 4	SYSTEM SOFTWARE REQUIREMENTS
SECTION 5	U-NMS HARDWARE SPECIFICATIONS
SECTION 6	CONFIGURATION CHARACTERISTICS
SECTION 7	INSPECTION AND TESTING

PART- B SECTION-1

UNMS FUNCTIONS

PART- B SECTION-1

UNMS FUNCTIONS

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PART- B SECTION-1

UNMS FUNCTIONS

1.0 Introduction

This section describes the functions to be performed by the UNMS system being procured. The applications of UNMS system are broadly grouped into the followings:

- a) Network Resource Management - This shall include inventory data discovery from NE and underlying NMS/EMS.
- b) Network Configuration & Planning - This shall enable user to Design, Assign, Activate/Provision, Configure, Re-Engineer, Network Planning & Capacity Optimization for the Communication system under the scope
- c) Fault Management with Analytics for trending & prediction for the entire communication system
- d) Performance Management of Communication system
- e) Trouble Ticketing (Incident Management & Web Portal)
- f) Reporting & Dash Boarding

1.1 UNMS Functions:

The following UNMS functions are envisaged for data acquisition system under this specification:

- Network Element (Any device i.e. Communication Equipment such as SDH,MPLS, PDH, DC Power Supply etc. communicating with UNMS system on SNMP or any Industry standard protocol) Data Acquisition
- The U-NMS system shall have capability of integration with multiple wired/wireless technologies like SDH, PDH, DWDM, CWDM, ASON, OTN, PTN, MPLS, VSAT, Radio etc. from multiple vendors.
- Data Exchange with UNMS/NMS/EMS system on SNMP, CORBA, XML, SOAP, HTTPS or any Industry standard protocol.
- Data Exchange with Information Storage & Retrieval (ISR) system/Historian system. ISR system and Historian system are used interchangeably in this specification.
- Data exchange through Web Services
- Network Status Processor
- Sequence of Event Recording
- Manual data entry
- Remote configuration of NEs

The UNMS system shall be provided with CORBA/XML/Q3/SNMP based North Bound, web service based open APIs, SOAP, HTTPS or any other industry standard protocol for data exchange with UNMS/NMS/EMS/ web services/ISR system and shall support SNMP traps, .csv files, MIB files or any other industry standard protocol for data acquisition from NE.

1.1.1 NMS/EMS/NE Data Acquisition

1.1.1.1 Status data

All status & Alarms shall be acquired in real-time from NMS/EMS/ NEs such as SDH, MPLS, PDH and DCPS located at various Control Centres, Substations and Power Plants.

1.1.1.2 System Data

The entire system data shall be auto discovered periodically as per frequency provided at relevant Appendices of the specifications, by exception and on demand.

The system data of NMS/EMS/NEs includes following inputs, but not limited to.:

- i. Location, Element Model, IP or NSAP Address & Vendor etc.
- ii. Physical & Logical Ports of all different layers - SDH, Ethernet, VCG, etc. ports.
- iii. Receive & transmit power for all optical ports
- iv. Logical CTPs (Connection Termination Point) with their occupancy status.
- v. Cross connections - SNCP - 2-Way, 3-Way & 4-Way (DNI), DRI, broadcast connections, unidirectional XCs
- vi. Protection group information for card and port
- v. Hardware inventory with serial number, part number, software/hardware version of the individual cards (including the history)
- vi. Topological link details
- vii. End to End circuit with complete route details.
- viii. Sub networks and sub network connection information.
- ix. Layer 2 EoSDH
 - a) Ethernet to VCG association
 - b) VLAN Associations with the VCG
 - c) VLAN Association with the Ethernet Ports
 - d) Flow Point Group/ EVC / Ethernet Service Discovery
 - e) Services with Port protection for Ethernet ports
 - f) Services with Port protection for VCG ports
- x. Time Synchronization status

All the following functions for NMS/EMS/NEs data acquisition shall be implemented for existing NMS/EMS/NEs. The list of all NMS/EMS/NEs for data acquisition by proposed UNMS is provided at relevant Appendices of the specifications.

1.1.1.3 Periodic Scans

Status data shall be reported by exception from the NMS/EMS/NEs and shall be updated and displayed within 4 seconds at UNMS Centre in worst case. A complete scan of all status data from the NMS/EMS/NEs shall be made by exception.

Other system data shall be periodically updated at UNMS Centre from NMS/EMS/NEs. Periodicity of data acquisition shall be user configurable,

1.1.1.4 Demand Scans

The UNMS Centre computer system shall be able to collect any data (individually, as scan groups, or collectively) from any of its NMS/EMS/NEs on a non-periodic (demand) basis. Demand scans shall be initiated automatically for an NE whenever the following situations arise:

- (a) A change of status of NMS/EMS/NEs is detected
- (b) NMS/EMS/NEs completion of a successful remote configuration action
- (c) Upon request by a User

1.1.1.5 Backup Communication Channel Processing

Redundant communication channels will be provided between UNMS System (UNMS Centre) and NMS/EMS/NEs. If valid data cannot be acquired from one of the NMS/EMS/NEs, the UNMS System shall automatically failover to the backup Communication channel. A communications failure shall not cause a server failover.

The backup communications channel shall be tested periodically up to NMS/EMS/NEs, without manual intervention, to determine its readiness to take over upon failure of the primary channel. An alarm shall be generated for any backup channel that is not ready to take over. A display shall be provided that shows whether each NMS/EMS/NE is being scanned on the primary or backup communications channel. The user, via this display, shall be able to:

- (a) Force scanning to a specific channel (primary or backup)
- (b) Manually fail a channel
- (c) Inhibit automatic failover of communications
- (d) Inhibit automatic fail-back of communications.

1.1.1.6 NMS/EMS/NEs in Test mode

A User of a UNMS Centre computer system shall be able to declare that any associated NMS/EMS/NEs is in the test mode. Placing an NMS/EMS/NEs in test mode shall generate an appropriate event message. When an NMS/EMS/NEs is in the test mode, the real-time database shall retain the last value from all points collected via the NMS/EMS/NEs before it was placed in the test mode. The points of NMS/EMS/NEs in test mode shall be marked with a quality code in the database indicating that their source NE is in the test mode. All system displays, programs, data links, and other devices shall use this value. Remote configuration of NEs that are in the test mode shall not be permitted.

When an NMS/EMS/NEs is removed from the test mode, an event message shall be generated, the test mode quality code shall be removed from all points assigned to the NMS/EMS/NEs, the database values shall resume updating on each scan and any remote configuration for the NE shall be enabled.

Test displays shall be provided that show the actual values being received from the NMS/EMS/NEs in the test mode.

When an NMS/EMS/NEs is in the Test mode, test personnel shall be able to inhibit and re-enable telemetry failure logic for the test NMS/EMS/NEs. When failure logic processing is inhibited, the

NMS/EMS/NEs shall be scanned at the scheduled times regardless of whether the NMS/EMS/NEs responds correctly, sends an incorrect reply, or fails to respond. A time-ordered record of the last 100 communications errors shall be maintained for each NMS/EMS/NEs in the test mode and shall be available for display. Data acquisition failure processing shall be automatically resumed when the NMS/EMS/NEs is taken out of the test mode.

It shall be possible for a UNMS Centre to have up to five NMS/EMS/NEs in the test mode simultaneously.

1.1.1.7 NMS/EMS/NEs Data Failure and Delete from Scan

If valid data is not received from an NMS/EMS/NEs in response to a scan command, another scan request for data from that NMS/EMS/NEs shall be issued. If valid data is not received from an NMS/EMS/NEs after configurable number of retries, each point affected shall be marked with a data failure quality code and an alarm shall be generated. If an entire NMS/EMS/NEs or its communication channel fails, only a single alarm shall be generated and the NMS/EMS/NEs shall be marked with data failure quality code. Communication with this failed NMS/EMS/NEs shall be retried at a periodicity, specified by the user, which shall be different from the normal periodic scan rate of the NMS/EMS/NEs.

In the event of NMS/EMS/NEs data failure, the last good value or status shall be retained in the database for each affected point. When NMS/EMS/NEs data returns to normal, the UNMS Centre computer system shall automatically resume updating the database with the scanned data.

When the user restores a point or NMS/EMS/NEs to scan processing, the UNMS Centre computer system shall automatically resume updating the database with the scanned data. User action for scan deletion and restoration shall generate an appropriate event message.

1.1.1.8 NMS/EMS/NEs communication monitoring, recording and statistics

The UNMS system shall be capable of monitoring and recording the data exchange that is occurring between the UNMS system and the NMS/EMS/NEs without affecting the normal NMS/EMS/NEs functioning. This shall include details such as the bytes exchanged, interpretation of type of data, interpretation of the message as per the communication protocol and the time stamp at which the message exchange took place. A User shall be able to invoke the monitoring and recording of the data exchange between the UNMS system and the NMS/EMS/NEs.

1.2 Data Exchange

1.2.1 Data Exchange with National UNMS Centres

The UNMS system shall acquire data of inter-regional links & cross-border links by exception calculated, manually entered and transfer time stamped SOE data from NEs & connected UNMS/NMS/EMS over SNMP, CORBA, XML, REST, SOAP, HTML, HTTP or any industry standard protocol.

Communication channels between Regional UNMS and National UNMS shall be configured in redundant mode. The communication channel shall be designed for automatic switchover to protection communication channel on failure of main links.

1.2.2 Data Exchange with ISR system

The UNMS system shall be able to exchange data with ISR system for all type of data envisaged in the specification to meet the requirement of ISR defined in subsequent sections.

1.3 Data Processing

The UNMS system shall prepare all the acquired data for use by the UNMS System applications. The UNMS system shall have capability to accept data from the following sources:

- (a) Real-time (also referred as telemetered) data received from Existing NMS/National UNMS and NEs
- (b) Calculation
- (c) Manual entry
- (d) Sequence of events data from NEs and connected UNMS/NMS/EMS,
- (e) NMS applications
- (f) Stored data
- (g) Web Services of Offline Applications

The data processing requirements shall apply to data collected from all specified sources. All time stamp used for data shall be in IST. Wherever source data reported in any other time format it shall be converted to IST. All input data and parameters, whether collected automatically or entered by a user, shall be checked for reasonability and shall be rejected if they are unreasonable. All intermediate and final results shall be checked to prevent unreasonable data from being propagated or displayed to the user. When unreasonable input data or results are detected, diagnostic messages, clearly describing the problem, shall be generated. All programs and all computer systems shall continue to operate with the old data or manually replaced data in the presence of unreasonable data.

UNMS system shall support processing of same data from minimum Two (2) number of sources for a point i.e. a UNMS point will have multiple sources of data and if one source fails it shall automatically switch to other source (e.g. redundant field data source, Calculation output, Application output etc.) in the order of priority (e.g. priority 1 to redundant field data source, priority 2 to Application output, Priority 3 to Calculation output, etc.) as defined by user during database modelling until good quality data is received. When any alternate source is used in place of Primary/Main source then all the display will show a quality code indicating the source of data as alternative source.

1.3.1 Data Processing

Data shall be stored in engineering values in UNMS database & processing shall be performed according to the requirements listed below.

a) Reasonability Limit Check

The reasonability limits shall represent the extremes of valid measurements for the point's value. All values shall be compared against defined high and low reasonability limits. The comparisons shall be performed at the scan rates of the values. An alarm shall be generated the first time a reasonability limit violation is detected. The last valid value of the variable shall be maintained in the database and marked with a quality code indicating the 'reasonability limit violation'. When data returns to a reasonable value, the new value shall

be accepted and return-to-normal message/events shall be generated. Reasonability limits shall be adjustable.

b) Limit Monitoring

For all quantities (such as tx power, receive sensitivity, BER, throughput etc.), there shall be a set of three limits. These limits will represent increasing levels of concern and shall be named as "Operational", "Alarm" and "Emergency" limits. These three limits shall be set within the boundaries of reasonability limit.

All acquired and calculated point shall be compared against sets of high and low limits set by User each time the value is scanned or calculated. Whenever a monitored point crosses a limit in the undesirable direction a limit violation alarm message shall be generated. The alarm message shall include:

- a. Time of limit violation detection
- b. Station name
- c. Point name
- d. Point value
- e. Name of limit crossed
- f. Value of limit crossed

Whenever a monitored point crosses a limit in the desirable direction, an exit event message shall be generated. The exit event message shall contain the same information as a limit alarm message except that it indicates that the alarm region bounded by the limit that was crossed has been exited. If multiple limits have been crossed since the last check, highest limit crossed shall be reported.

All limit monitoring shall preclude annunciation of multiple alarms when a value oscillates about an alarm limit by utilizing adjustable alarm dead-band for each point.

It shall not be necessary to specify zero or infinity as an operational or emergency limit. Limit comparison shall be carried out only with respect to the specified limits.

The user shall be able to temporarily override an in-use limit by entering a new value. When the user overrides a limit, it shall be marked with an override quality code on all displays. The override value shall be recognized, and any display, report, or log containing the value of the overridden limit shall include it as such. An override value shall be used instead of the permanent value until the user removes the override condition, selects an alternative limit set, or the system is re-initialized. A limit override summary shall be provided that lists all overridden limits.

Any change in alarm states resulting from a change in limit value shall be reported/alarmed.

1.3.2 Calculated Data processing

UNMS system shall be capable of performing the following calculations at the indicated rates and storing the result in the database as calculated data and shall be available for display. The database variables to be used for arguments and the mathematical, statistical and logical functions to be used as operations shall be definable interactively at a workstation by dispatcher as well as by the programmer using database creation and maintenance procedures. The calculations shall be executed either on an exception basis i.e. whenever the inputs of the calculations changes or periodically. The periodicity of calculation shall be user modifiable. Suitable application/API/display shall also be provided to define Real time Calculations.

Calculated values shall use database points as the arguments and combined mathematical, logical and statistical functions as the operators. Functions such as addition, subtraction, multiplication, division, maximum value with time of occurrence, minimum value with time of occurrence, percentage, average value, count, square root, exponentiation, trigonometric functions, logarithms and other statistical functions, logical & comparative operators such as AND, OR, exclusive OR, NOT, Less Than, Greater Than, Less Than or Equal To, Greater Than or Equal To, and Equal To etc. shall be provided.

Calculated status values shall use database points as arguments and combinational logical functions as operators that include the logical & comparative operators AND, inclusive OR, exclusive OR, NOT, Less Than, Greater Than, Less Than or Equal To, Greater Than or Equal To, and Equal To.

Suitable rules or operators (such as multi-level parentheses) shall be provided to indicate the sequence of operations in the calculation. Some of the calculations on telemetered and calculated analog points are defined below.

User shall be able to drag and drop the arguments to define calculation from any display.

It shall also be possible for operator to see the formula used for a calculated value from the any display where calculated value is appearing.

1.3.3 Quality Codes

Quality codes indicate the presence of one or more factors that affect the validity of a data value. All quality codes that apply to a data value shall be maintained in the database for that data value.

For calculated data, the presence of a quality code on any of the component data values shall not disrupt the calculation using that value. The quality of the calculated value shall be the quality of its "poorest" component. Results of calculations that are manually overridden by the user shall be denoted with a quality code that can be differentiated from the propagation of a manual entry quality code from one of its component values.

The following are the data quality codes that have been defined in this Specification and whether the quality code should propagate to the result of a calculation.

Quality Code	Propagate	Details
a) Telemetry Failure	Yes	Telemetry has failed
b) Service failure		Any service such as data/voice for RTU, PMU, Control Centres etc. failure
c) Link failure		Any link failure affecting traffic flow
d) Delete From Scan	Yes	User has disabled the update of data from database
e) Reasonability Limit Exceeded	Yes	Reasonability limit violated
f) Invalid data	Yes	When the data is not valid in 2.4 (d)
g) Manual Entry	Yes	Values entered Manually

h) Test Mode (NE)	Yes	
i) Alarm Inhibit	No	Alarm processing has been prohibited
j) Alternate Source	Yes	Data Quality code indicating alternate source of data

1.3.4 Real-time data storage and playback

All real-time data with quality code shall be continuously stored online for at least Twelve months at scan rate.

It shall be possible to playback above stored data on Single Line Diagram and Network Diagram for a configurable time window (configurable from 1 minute to 10 minutes) by defining Start Date, End date, time of window and sampling rate for play back. It shall also be possible to set a different sampling rate for playback than the sampling rate for data storage. It shall be possible to have tabular and graphical trends from the stored data.

The user shall be able to view the stored data on UNMS system displays such as on Single Line diagram, Network Diagram & Trend display by placing a workstation console monitor in a history mode for a specified time and date. Any system displays subsequently called up on that monitor shall display the data that existed at the specified time and date, or the closest previous time available. The history mode and the historical time and date shall be prominently indicated on each display.

The users shall be able to select the time window of interest to save part of above data in a separate file (file name describing incident/disturbance data contained in the file) for archival in the ISR system for future retrieval and playback in UNMS system. This archived data shall be transferable in database tables of Historian system for generation of reports. The Snap-shot archived data may be used by UNMS applications in study mode.

1.3.5 Redundant data Source processing

All data in the UNMS database may be obtained from more than one source and there shall not be any restriction or limit on number of redundant sources for a point. Typically, the “best available” source of the data shall be chosen for use in displays, reports, and other functions. This feature of choosing the best available source is “redundant data source processing” function. The inputs to redundant data processing function shall be called “arguments”, and the chosen source is called the “resultant best value.” The arguments may be NE Data values or the values from proprietary NMS or the values from the backup UNMS centre. The resultant best value shall be stored in the UNMS database with Quality Code.

When defining the calculation for a resultant best value, the user will rank the arguments in a priority order. The resultant best value shall be determined by selecting the “best available” from among the arguments. The highest-ranking argument with a valid value shall be stored as the result. If none of the arguments have a valid value, the highest-ranking item with the best quality shall be stored as the result.

Users shall be able to override automatic selection and manually select any argument. Restoration of automatic redundant data processing shall require manual action by a user. Automatic and manual changes of the selected argument shall be reported as an event.

1.4 Sequence-of-Events (SOE) Recording

SOE data is the time stamped chronological/reverse chronological listing of status change/events collected from the NEs directly and through connected NMS/EMS/UNMS centres. The SOE data is time tagged with one second resolution. SOE data shall be collected by the system and shall be made available for review by user. All necessary processing required on the SOE data like filtering, sorting, merging, mapping is to be done at the UNMS Centre.

The description of each event shall include the device name (Alias Name), in addition to database description name, device state, the date, and the time (to the nearest second) of each event. Events shall be displayed and logged in chronological order. The user shall be able to select the display of events by stations, or the entire power system covered by the control centre. SOE data shall also be stored in ISR system.

1.5 Remote Configuration

An appropriately authorized user of a UNMS system shall be able to control the configuration of NEs. It shall be possible to assign a number of controllable NEs in one group and then control all the devices by executing a single control command on the group. A control action shall require a confirmation-of-selection-prior-to-execution response. Initiation of the control execute step shall occur after the user confirms that the correct point and control action have been selected.

If, after selecting a point, the user does not execute the control action within a programmer-adjustable time-out period, or if the user performs any console action other than completing the control action, the selection shall be cancelled and the user informed. The user shall not be prevented from requesting other displays, performing a different remote configuration action, or performing any other user interface operation while the UNMS Centre waits for a report-back on previously executed control actions. The device undergoing control shall be highlighted by the Computer system with a different colour/graphical attribute so that it is identifiable by the user. This highlighting shall be present till the receipt of desired feedback from the device.

The system shall process remote configuration commands with a higher priority than requests for data from the NE data acquisition function.

It shall be possible to configure a new NE added in the system Remotely from UNMS center. User Shall have the facility to add new NE, assign IP, Configure and Configure link/service in newly added NE. Newly added NE, after configuration, shall automatically be added in the underlying NMS/EMS and all the IP/Link/Services configured in the new NE shall automatically be added in the underlying NMS/EMS.

1.5.1 Remote Configuration Action Monitor

The response to all remote configuration shall be verified by monitoring the appropriate feedback variable.

The user shall be provided with an indication that a configuration action is in progress and, subsequently, a report of the result. If the configuration was unsuccessful, an alarm shall be generated that states: (1) the configuration message exchange was not completed successfully, (2) the device failed to operate, or (3) the device operated but failed to achieve the desired result. If the configuration was successful, an event message shall be generated noting that fact.

For commands issued as part of a group configuration, the successful completion of all device control actions shall be reported via a single message. If the operation is unsuccessful, the user shall be informed of those devices in the group that failed to operate.

1.6 Information Storage & Retrieval (ISR) System

The ISR System shall capture raw production data in real-time, at its original scan rate from system such as Network resource management, fault management, performance management, trouble ticketing etc. and the same shall be submitted for approval during detail engineering. The raw data can be captured either by exception or periodically. The ISR System shall be a COTS (Commercial off the Shelf) product and shall provide user-configurable graphical visualization, reporting and analysis. It shall display current and past operating conditions on desktops anywhere and anytime throughout the enterprise and beyond. It shall store the information online for all data for 1 years and 6 years offline at its original resolution making it instantly available for deep and broad analysis, trending and bench marking for continuous processes improvements. The ISR System shall provide operators, engineers, and management with direct access to one integrated source of information. ISR system shall provide provision of insertion of future values in Historian.

1.6.1 Configuration of the ISR System at Main and Backup Control Centres

The ISR System shall communicate to the U-NMS servers and sample the near real-time values as configured by the User. The addition, deletion, or modification of data to be collected and processed shall not result in loss of any previously stored data during the transition of data collection and processing to the revised database.

The ISR System should support High Availability (as per relevant Appendices of this specifications) and, automatic failover, interface data buffering to guarantee no data loss, and no impact to clients or applications in case of communication loss or data server shut down for maintenance or security patch installations, etc. The ISR System shall provide the trace logs for audit trails and audit purpose.

Software utilities shall be provided in the ISR System to back-up the Historian data to an auxiliary memory (e.g. SAN System) available on network. This software shall have the feature of automatic as well as the manual backup of data. This utility shall also provide the feature of retrieval of data for selected period to be used in generation of reports through user-friendly pull-down menu and drag and drop facilities to generate reports/displays with performance requirement as provided at relevant Appendices of this specifications.

1.6.2 Features required with the ISR System

The following features shall be provided along with the ISR System application:

1.6.2.1 Interface with U-NMS software for acquiring the real-time data

The ISR System shall exchange data with the U-NMS system and ensure high performance for real-time data exchange. The data value as well as quality codes shall be received from the U-NMS system. Data must be time stamped according to the sending system and not on receipt by the ISR System unless no other time stamp is available. The ISR System must store all the time series data in its original time-resolution and associated quality code in a real-time database.

1.6.2.2 Organization of data and configuration

The asset or communication system topology model hierarchical structure shall be stored in ISR System with versioning/archiving capability, and with roll-ups to aggregate data on near real-time bases. The ISR System must be able to link data points held within the Historian to the process model defined in U-NMS System.

1.6.2.3 Calculated values

The ISR System must be able to perform any mathematical calculations on raw data values before being displayed. The ISR System shall also have data summary function for defining calculations such as totals, percentage, averages, and other aggregates from real-time data inputs. The equations of these calculations shall be able to use mathematical functions, logical operators, conditional operators and trigonometrically functions. Calculations shall be started and reset based on time. The ISR System must be able to save calculated values as separate data points. The ISR system shall perform the calculations in real time and allow results to be trended and archived with the raw data without affecting the operations of the source systems.

The calculation engine shall be able to define aggregations based on asset type, totalizers (accumulators), and performance equations formulas and shall support periodic or time-based or event-based triggers. The calculation expression shall allow the users to implement complex calculations without any formal programming and coding. The calculations shall be able to be done by asset-based/group-based, instead of per-point bases. All calculations shall provide the re-calculation functionality to automatically or on-demand to re-calculate the historical data.

1.6.2.4 Real-time data interfaces

The ISR System shall provide near real-time, fault-tolerant, high-speed links from any industrial automated real-time data sources through an industry standard interfaces such as such as OPC,UA/, OPC DA and OPC HDA, connector. Also it shall have interfaces compatible with DAS (1.0A AND 2.0) COMPILANT SERVERS, SQL, and ODBC.

1.6.2.5 Graphical user interface

The graphical user interface shall be provided. The User interface shall facilitate contextual organization of information for decisions making. The GUI shall create and display real-time and historical data, including customizable equipment schematics and trends, for faster evaluation by all the users.

The UI shall have following feature:

- 1) Drawing tools
- 2) Ability to incorporate trends
- 3) Easy to zoom-in/zoom-out capability.
- 4) Drilldown
- 5) Reports shall be configurable for different time/region/states/services/network/links/channels ranges by simply changing the report time/region/ states/services/network/links/channels cells.
- 6) Ability for report to carry some manual entry.
- 7) Excel based add-in Reports.
- 8) Major and minor axis of plots shall be user configurable.

1.6.2.6 Interface with office applications

The ISR System shall allow retrieval of data into Microsoft Excel or .csv. It shall provide menus to extract data into spreadsheet.

1.6.2.7 Manual data entry

The ISR System shall have the capability to accept manual data also. This information shall be used to complete the picture of operations and required for problem diagnosis or reporting in conjunction with the data collected automatically. Manual data entry shall be allowed from defined clients with audit trail.

The ISR system shall have feature of the manual correction of the archived data with a unique flag. This shall be limited to only to the authorized users. All such changes shall be logged to the audit file for future reference.

1.6.2.8 Interface with Business Applications

A well-documented API shall be provided to exchange data with third party software. The API must be able to query data and models held within the ISR System. The Historian System must offer connectivity to third party systems using multiple protocols e.g.; OPC/ ODBC/ OLEDB/ JDBC and web services.

1.6.2.9 Data migration requirement

The ISR System shall provide means of migration of data by importing and exporting old data in a predefined standard format such as .csv/.xls etc. files or through APIs so that the data can be migrated to another system.

1.6.2.10 Mass storage of files and Data

The ISR system shall also be used for mass storage of data and files application save-cases, etc. External file (i.e. monthly compiled data) shall also be stored for archiving and retrieving purposes.

Requirement mentioned in this section for storing various files / savecases in ISR system to be fulfilled by using SAN with proper back-up of it.

1.6.2.11 Sequence of event (SOE) data interface

ISR system shall store the sequence of event (SOE) data and shall generate report as and when required. It shall be possible to import ID as well as detailed name of the imported parameter (which will be used during reporting). Proper log generation system shall be in

place in case data available for archiving and not stored in historian due to some reason. SOE transfer in historian shall be either automatic or on demand by operator. All stored data shall be accessible from any time period regardless of changes made to the database after storage of that data. Report generation of SOE shall be possible with sorting facility of parameter.

1.6.3 Report Generation (in MS office, pdf, etc. format)

A Business Tool shall be provided with user friendly configurable with (preferably drag and Drop) query builder, report builder and trend builder facility. Reports can be generated on user demand, on a preset timed interval, or be driven by specific events. The contractor shall be required to generate the Daily, Weekly, Monthly & Annual reports formats. The user shall be able to schedule periodic generation of reports, direct report to display, print report, and archive report using report scheduling display. The report scheduling display shall enable entry of the following parameters, with default values provided where appropriate:

- a) Report name
- b) Time the system shall produce the report.

The user shall be able to examine and modify the contents of reports for the current period and for previous report periods using displays. Any calculation associated with the revision of data in a report shall be performed automatically after data entry has been completed.

The reports shall also contain the followings –

- a) Operator entered fields of English & Hindi/other language text, symbols, images, etc.
- b) Trends and charts (2D and 3D).
- c) Report embedded with Google map for geographical location performance.

1.6.4 Historical Trending

The Historical trending facility should have feature/facility to

1. Rescale and Re-label axis.
2. 3 dimensional display.
3. Zoom in and Zoom out on data.
4. Selections of points through pointing device preferably drag and drop features.
5. Display the timestamp and value of all the trends for any point on the trend while hovering over it with the mouse.
6. Save the configuration (trend point, sampled interval, trending period etc.) for viewing at later stage.
7. Plot raw, average, interpolated, min and max over a user defined sampled time.

1.7 Programming development system (PDS)

The Programming Development System (PDS) shall be supplied at UNMS Centre. Many of the development system requirements are defined by reference to the corresponding system requirements in the Specification. When requirements are defined by reference, the development system shall meet relevant requirements of the referenced section and all subsections to that referenced section.

1.7.1 General Requirements

The PDS shall consist of sufficient hardware and software to develop the database, displays, and reports that are required for the UNMS system. These data bases, displays, and reports shall be used for factory test. The PDS system shall be supplied in advance, as per implementation schedule mentioned in relevant appendices of the technical specification, for creation of data base that will be used for various functions, applications, test etc.

During installation of UNMS, the development system shall be reconfigured as part of the system with all necessary software upgraded to the same revision level as the newly delivered system and with all necessary databases, displays, and reports transferred from the development system to the UNMS system. Once reconfigured in the field, contractor's software engineers shall be able to maintain all system software, displays, database, and reports via the resulting UNMS systems.

1.7.2 Development System Functions

The development systems shall include all functions required to support the generation and testing of the system software, database, displays and reports. The development system shall also include tools to acquire data from NEs and NMSs under test mode as a minimum to test the NEs and NMSs installation. Testing capabilities related to Contractor-supplied system software apply only to the ability to call up employer-generated displays and reports and verify linkages to the database.

1.7.3 Development System User Interface

The user interface for development system shall provide similar capabilities and features described in relevant section of the specifications. Sufficient user interface functionality shall be included to enable employer engineers to perform the following tasks:

- a) View displays generated on the development system.
- b) Test linkages between the displays and the database and between the reports and the database.
- c) Configure NEs
- d) Test receipt of data from NEs/NMS.

1.7.4 Development System Software Requirements

The development system software shall support the requirements as described in relevant Section technical specifications. Updated versions of the system software shall be

installed on the development system, if required. All the symbols/libraries and colour codes used in the display design for UNMS user interface shall be developed and made available in the development system. All necessary development tools shall be provided by the Contractor.

1.7.5 Development System Configuration Characteristics and Availability

The following sections describe the requirements for development system configuration characteristics and availability.

1.7.5.1 Development System Configuration Characteristics

Development system configuration shall support the system functions, user interface, system software, and hardware as specified in Sections of the specifications.

1.7.5.2 Development System Availability

The development system shall be non-redundant. It shall exhibit a minimum availability of 98% for the functions specified in relevant, Sections of specifications. Each development system device, including processor, shall also exhibit a minimum availability of 98%.

1.7.5.3 Development System Hardware

The development system hardware shall meet the following minimum requirements:

- a) Processor: The development system processor shall be sized such that the response times of the software, display, database, and report maintenance functions are compatible to function response times of UNMS for 15 NEs.
- b) Consoles: One high-performance system consoles of desktop type shall be delivered with each development system. This console shall include a video monitor, keyboard, and cursor positioning device. The console shall be of the same make, model, and series required by the UNMS system.

1.7.6 Development System Testing

Prior to shipment, the Contractor shall demonstrate the functionality and performance of the development system software and hardware to employer representatives. A list of the software and hardware to be demonstrated shall be prepared by the Contractor and submitted to employer for approval at least 2 weeks prior to the demonstration. The demonstration shall be at least 3 days in duration. All problems identified during the demonstration shall be recorded as specified in relevant Sections of TS. The resolution of all variances must be agreed-upon prior to shipment. Employer understands that the development system will be shipped early in the software development phase of the project and therefore agrees to postpone the resolution of problems that do not materially

affect the ability to perform the development activities described in this section until the resolutions are needed in development effort.

Formal field installation, field performance, and availability tests shall be conducted on the development systems, with the final UNMS system. These tests shall meet the requirements of relevant section of this specification.

For UNMS factory acceptance testing (FAT), additional Contractor-owned hardware, employer spare parts, or other employer-approved techniques shall be used to simulate the development system hardware in the integrated FAT configuration. Employer does not intend to return the development system hardware for the UNMS factory tests.

1.7.7 Development System Training, Support Services, and Maintenance

This section describes the requirements for development system training, support services, and maintenance.

1.7.7.1 Development System Training

System training needed for efficient use of the development systems shall be completed on the delivered system within the first two months following delivery of system. Development system training shall include, but shall not be limited to the NEs configuration, integration, database, display, and report generation training courses described relevant section of the technical specification.

1.7.7.2 Development System Support Services

The support services specified in this specification shall also be provided for the development system. The Contractor shall provide all software updates and problem resolutions necessary to fulfil its display, database, report and software generation responsibilities.

1.7.7.3 Development System Maintenance

The maintenance requirements of this specification shall apply to the development systems. The Contractor shall be responsible for the hardware and software maintenance of development system through completion of its reconfiguration as part of the respective UNMS system. After this event, all hardware and software maintenance support specified for the UNMS system shall apply.

1.7.8 Development System Project Management, Quality Assurance, and Documentation

The provisions of this specification for testing, documentation etc. shall be applicable for development system also.

-----End of the Section-----

PART- B SECTION-2

UNMS SYSTEM APPLICATIONS FUNCTION

PART- B SECTION-2

UNMS SYSTEM APPLICATIONS FUNCTION

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PART- B SECTION-2

UNMS SYSTEM APPLICATIONS FUNCTION

2.1.Introduction

This section describes the functions to be performed by the Unified Network Management System (U-NMS) applications to be procured. The UNMS applications are broadly grouped as follows:

- a) Network Resource Management - This shall include inventory data discovery from NE and underlying NMS/EMS.
- b) Network Configuration & Planning - This shall enable user to Design, Assign, Activate/Provision, Configure, Re-Engineer, Network Planning & Capacity Optimization for the Communication system under the scope
- c) Fault Management with Analytics for trending & prediction for the entire communication system
- d) Performance Management of Communication system
- e) Trouble Ticketing (Incident Management & Web Portal)
- f) Reporting & Dash Boarding

U-NMS applications shall facilitate centralized supervision, operation & control of the Regional and State level Communication system being used for Power System Operation & Monitoring on round the clock basis. It shall be possible to operate, monitor, configure, addition/ deletion and control elements of Communication Network from U-NMS. This system shall also assist in the operations and maintenance of the communication resources including detection of circuit failure and system performance, the diagnosis of problems, the implementation of system suggested remedial actions and the allocation or reallocation of communications resources. The database shall be available centrally at regional level. The regional server shall have multiple database for each State constituent and Regional/ISTS. It shall be the responsibility of each User to manage & maintain its database. Data shall also be exchanged between state and regional databases, and during operations it shall be synchronized at a periodic interval to ensure a matching database.

2.2.Design Requirements for UNMS Applications

The U-NMS system application shall have capability of integration with multiple wired/wireless technologies like SDH, PDH, DWDM, CWDM, ASON, OTN, PTN, MPLS, VSAT, Radio etc. from multiple vendors. However, during implementation of UNMS, transmission system technology, termination/cross-connect/Access system configured in the network shall be considered for integration in the proposed U-NMS. UNMS system shall ensure seamless operation & management of Communication network viz. fault Management, Design & Provisioning, Inventory management, Performance monitoring etc. without dependency on underlying NMS/EMS. Proposed UNMS Performance Parameters for various aspects are provided at relevant Appendices of the specifications. The system shall have capabilities to take manual inputs for the systems which are not integrated and shall consume & correlate the same for system discovery and O&M.

The data processing requirements shall apply to data collected from all specified sources. All input data and parameters, whether collected automatically or entered by a user, shall be checked for reasonability and shall be flagged/ rejected if they are unreasonable. All intermediate and final results shall be checked to prevent unreasonable data from being displayed to the user. All programs and all computer systems shall continue to operate with the old data or manually replaced data in the presence of unreasonable data.

Further, the sub-system applications should support the following:

- a) The sub-systems used to provide the above services should be fully integrated among each other so as to provide seamless operations.
- b) The design concept, functional and informational architecture and physical architecture shall comply with ITU-T Recommendation M.3010.
- c) The source codes /web-services based open APIs of the proposed U-NMS application shall be provided to the Employer to allow integration with upper-layer or same layer management systems via WSDL or XML/SOAP/HTTPS etc.
- d) Supplied U-NMS system application shall support north bound CORBA/XML/Q3/SNMP or any other acceptable open standard interface for ensuring integration with other existing/upcoming U-NMS of similar nature.
- e) The supplied UNMS system application shall support data exchange with offline applications such as upcoming or existing ERP system/IT system/Communication system/NMS in standard format like ODBC, OPC, XML, .CSV, .TXT, .XLS etc. ensuring cyber security standards.
- f) The supplied UNMS system application shall be able to exchange data with the supplied Information Storage & Retrieval (ISR) system/Historian system for all type of data envisaged in the specifications.
- g) The UNMS system application shall have capability for integration and open APIs shall be provided for the integration with Employers other systems such as Billing system, GIS system, ERP system and IT systems.

2.3.Application Functions

2.3.1. Network Resource Management:

There shall be facility for discovering the entire existing network and service/circuit inventory. System shall support Auto Discovery and on demand Manual discovery of Network Inventory, Network Topology, Services/Circuits and Topology Links. It should be possible to define and view a complete Topology of the network in the Network inventory solution.

System shall integrate with EMS (element management systems)/NMS (Network Management Systems)/ NE (Network Elements such as SDH, PDH, DCPS etc.) to capture network inventory. Redundant communication channels shall be provided between UNMS System (UNMS Centre) and NEs/underlying NMS/EMS. If valid data cannot be acquired from one of the NEs/NMS/EMS, the UNMS System shall automatically failover to the backup Communication channel. A communications failure shall not cause a server failover. The backup communications channel shall be tested

periodically up to NE, without manual intervention, to determine its readiness to take over upon failure of the primary channel.

Further, it shall have facility to integrate with more than one of the following applicable sources and discover /capture the inventory from a combination of sources to build the E2E Network inventory:

- a) Integration with other Existing Inventory Management Systems, if exists.
- b) Importing from Excel files
- c) Support in the proposed system for Templates / Rules based inventory building

Inventory data in the context of U-NMS refers to service/circuit, logical and physical network inventory data besides others required in order to implement the service-assurance related functionality of the U-NMS. The data that has to be maintained shall include the following but not limited to:

The U-NMS Application shall do Automatic Topology Discovery for complete network and shall also create Regional and State/ Utility/ Area Communication Network Model for real time application and for study purpose. Appropriate Bridge/Agent/Adapter software for each Vendor technology shall communicate either with the respective NMSs or with the NEs directly, without adding any further delay.

2.3.2. Communication System Network Model Update:

The communication system model to be used by the application shall reflect present conditions of network as reported by EMS/NMS/NEs, ICCP/ other system data Exchange from connected Control Centres and as entered by the users. The Communication System Model Update (CSMU) function shall also include the following features, e.g. communication network model of STM 4/16 topology comprising of various communication rings/ radial branches. This topology and the associated model parameters shall be based on: (1) Telemetered switching/ node/ NE device statuses, (2) manually entered device statuses, (3) manually entered in-service or out-of-service designations for modelled elements. (4) manually entered modelled elements, e.g. SDH/PDH/DCPS/NMS etc.

- 1) Separate communication network model shall be provided for study & planning purposes.
- 2) Maintain a detailed device oriented model of regional/ state level communication system and model equivalents of connected systems in other regions/ countries which has interconnections with India.
- 3) Execute state estimation & System analysis functions for the Communication system using the nominal value or the typical network save case scenario of the regional communication network, with the entire regions/ states node, traffic, latency etc.
- 4) The application would then filter, correlate, reconcile and stitch the data together to give a complete picture of the E2E circuits comprising of multiple make nodes from multiple vendors and topology of the network.

- 5) Auto Discovery System shall have GUI based User Interface to provide map based GUI to view the discovered Information on geographical map such as Google earth etc., tracks discovery processes and allows to add/modify/delete profiles, which defines scope of discovery. GUI module shall be capable to present the different features to the users based on their respective privilege.
- 6) Since any communication network will undergo frequent changes, there should be an automatic way to discover the newly added links. Deletion of the existing links shall also be possible by adopting a similar approach with user confirmation. The system should support dynamic addition/deletion of new links and modification of existing links.
- 7) The system shall provide for the categorization of the circuits (Healthy Circuits, Hanging Circuits, etc.) and shall discover the circuits found hanging and the same would be identified and reported to the user.
- 8) The system shall provide GUI support to provide a view of all incomplete discovery run status with option to suspend/resume/cancel. It should also provide the history logs of completed discoverer processes
- 9) Manual data entry or data population of the U-NMS data stores should be minimized or avoided completely wherever feasible.
- 10) The system shall support circuit end-to-end route discovery and display in GUI view, including network, node, card, port, timeslot with all internal patching etc. (MUX /DEMUX, OUT level).
- 11) The system shall provide inventory management process automation capabilities and offer full visibility of all communication assets across the Regional/State/Cross-border/Inter-region Utility network.
- 12) The system shall discover the physical and logical attributes for all the equipment and for all equipment types in the network.
- 13) Physical attributes shall include node name, node id, channels available, NSAP/IP address, Serial number, Shelves, Slots, cable and ports etc.
- 14) Logical attributes to be discovered shall include cross connect details, bandwidth, A end and Z end, CTP details, Protected/Unprotected circuits, Topology link, Protection paths, Circuit names, System configurations, etc.
- 15) The system should allow discoveries of smaller subsets of the network.
- 16) The IP based (SUBNET) discovery of network elements should also be supported.
- 17) It should be able to create profiles and initiate the profile-based discovery.
- 18) It should provide different reports based on the discovered data and export the data in mutually agreed formats such as .xls /.pdf/.html/.doc/.ppt etc.
- 19) The system should support configuration of threshold for data poling to ensure CPU utilization is not exceeded permissible limit per vendor or discovery schedule. The same shall be depicted by a system-generated report for an instantaneous / average utilization of resources (such as CPU, RAM etc.)
- 20) The system shall have facility for presentation/bulk display/search page as well as export in agreed formats.
- 21) The system shall support GUI reports for examining the utilization of the resources such as Port, Link etc. The system should be able to provide link and ring utilization information.

- 22) The system shall support creation of Virtual Network Elements (VNE) and virtual networks for representing the 3rd party network elements and network respectively. In addition, it must also support addition of inventory to the VNE/Virtual network to provide the end-end view of the circuits passing through 3rd party networks.
- 23) The system shall provide facilities for creating custom grouping of available network elements in to different maps.
- 24) The system shall allow performing renaming of trails on bulk basis as well.
- 25) The system shall accept the source and destination ports of the ring to be discovered.
- 26) The system shall present the consolidated link utilization report, ring utilization report and drop traffic reports for each discovered ring
- 27) The system shall be able to provide a list of all Network elements with respect to all the Network Management systems that are managed by the system.
- 28) The system shall have the capability to discover and model the Ethernet Layers.
- 29) The system shall have the capability to add additional parameters or attributes to the discovered data through a GUI to enrich the discovered inventory.
- 30) The system shall have the capability to provide the discrepancy reports comparing the discovered data with the previous discovered data.
- 31) The discrepancy identification, reporting, correction/deletion shall be workflow based and shall require user approval at various stages.
- 32) The system shall have the capability to expose the discovered data through standard NBI e.g. TMF 814 etc. to external 3rd party systems
- 33) The system shall have the capability to expand along with the network. The system shall be able to accommodate new vendor, network growth based on network elements, new device types etc. in the proposed system.
- 34) The system shall be scalable vertically and horizontally based on growth in the network
- 35) The system shall have the capability to integrate with Assurance and Fulfilment Systems to provide enriched Inventory.
- 36) The system shall discover synchronization status of all communication equipment (as applicable) and display in GUI view indicating the synchronization status of each node. The system should discover the sources (at least primary & secondary) and display. The system should also discover & report nodes, which are discordant or running on internal clock.
- 37) Real time inventory and bandwidth utilization status & reports (vendor wise, node wise, section wise, ring wise, region wise, technology wise and for complete network) shall be provided as per the frequency to be decided or whenever required.
- 38) Discovery and Inventory (Passive):
 - i. The system should be capable of monitoring passive inventory (inventory in stores, issued to contractor for deployment or in transit etc.). Passive inventory needs to be manually discovered. As part of initial Inventory loading to the system, the contractor shall be responsible to consider all the existing Network Inventory for building database and configure the same and correlation of services with respect to allocated Network Services and Network resources.
 - ii. The system should be capable of keeping audit trails of changes in inventory system.

- iii. The inventory system shall be capable of showing up to date (recently) discovered data in GUI in sync with earlier discovered data.
- iv. There should not be any dependency on data availability during stitching post discovery.
- v. System should have capability to reserve paths for expected services for which preliminary approvals have been done.

2.3.3. Network Configuration and Planning

- 1) The purpose of Network Configuration & Planning System is to enable design, assign, provision, configure, re-engineer, plan and process activation of new services in the communications networks from a central location. A User enters the necessary information into system. Provisioning system delivers it further to the right network elements, after which the services are activated. Provisioning system shall interact with network elements or NMS for the provisioning. The time taken for E2E configuration & provisioning from command to execution including data pulling from multiple NMS and final execution by U-NMS shall be as per relevant Appendices of the specifications.
- 2) The provisioning system shall interface with the inventory management system and update service and network inventory.
- 3) The system shall ensure that the requested service is provisioned on the required network elements/NMS.
- 4) For an end-to-end bandwidth request, the provisioning of resources shall be done in a manner so as to optimize the path and minimize fragmentation of bandwidth.
- 5) The provisioning system must be capable of provisioning a working path and protection path. Switching to protection path in case of failure of main path shall be automatic and switching time shall be as per relevant Appendices of the specifications.
- 6) The bandwidth provisioning system shall automate the end-to-end provisioning for a given source and destination for the entire Communication network hierarchy and would also indicate, (on demand) the congestion scenario arising due to this, and indicate the necessary resource/ inventory procurement/ allocation needed for efficient & economic operation of the system. This information shall become an input for the Network Planning Software/ tool for simulating the scenario.
- 7) The bandwidth provisioning system shall have the capability to perform pre-activation validation
- 8) A batch interface shall also be supported for service provisioning requests.
- 9) The proposed system needs to interface with NMS/network elements belonging to different OEMs, supporting different interfaces in the future also.
- 10) The system should be capable of giving multiple options & set rules for selecting specific path & 2nd best possible path for provisioning.
- 11) The system shall log service provisioning information such as: Date of Request, Time of Request, Type of Request, Status of Request, Request Id, Requester Details etc.

- 12) The system shall assign processing priorities to provisioning requests based on origin and / or destination.
- 13) System shall be able to operate in centralized or de-centralized mode, i.e. the provisioning shall be performed from a central location under Centralized mode requirement and if necessary the provisioning for a particular region / location can also be performed by any user from that particular region / location.
- 14) The system shall support the time component along with any of the dates so that it shall make possible the activation of a service at a particular time and date.
- 15) There shall be a front end to monitor the status of the requests and any errors in processing.
- 16) All the activities happening through the system shall be tracked and a history shall be maintained for duration as mentioned in relevant Appendices of the specifications.
- 17) The offered system shall be configurable & customizable.
- 18) The provisioning system shall support rollback in case the activation fails.
- 19) The provisioning system shall support roll back to revert back to the earlier status which shall also make necessary changes in underlying network as well. User should be able to define specific roll back points. There should be facility to configure the number of attempts and the frequency of attempts before rolling back the activation process.
- 20) The system shall be able to support establishment of user groups, and permissions to restrict certain users to specific provisioning activities.
- 21) The system shall send provisioning transactions to the NMS/EMS/NE in the real time
- 22) The system shall support field validations during provisioning input.
- 23) The system shall support automatic bandwidth grooming feature across multiple Networks.
- 24) The system shall facilitate feasibility study for providing a circuit of a particular capacity between two end points and also block the network resources for a configurable time period & export API's for external applications too.
- 25) The system should support path computation and Circuit Layout Record (CLR) generation for path activation, with or without constraints like Ring diversity or Route diversity or the combination of ring or route and any existing circuit.
- 26) System should be in a position to carry out the Auto deactivation and activation in a manually planned as well as in a phase wise manner.
- 27) The system shall facilitate identifying Hanging Circuits in the Network. Such circuits shall be identified and reported to the user. On confirmation from the user, the hanging circuit shall be deactivated.
- 28) The system shall be able to flow-through provisioning and activate network devices & services in a multi-vendor EMS/NMS/Device landscape to support "flow through service activation".

- 29) On successful provisioning, the system shall update the inventory database so that the resources are not considered again for further provisioning.
- 30) The system shall support concurrent provisioning to various NMS/EMS.
- 31) The system shall propose various path options for different services between two locations or NEs – shortest, least cost, minimum delay and optimized path based on the following:
 - i. Cost
 - ii. Rings count & Hop Count
 - iii. Bandwidth Available
- 32) The system shall provide capability to a user to be able to reject the best path computed/proposed by tool and to select/view from alternative options.
- 33) The system shall provide GUI to view the designed end-to-end circuit/service before activation in network.
- 34) The system shall support all type of planned network changes.
- 35) The system shall provide the list of circuits/links/services, which are pending for provisioning.
- 36) The system shall support upgrading/downgrading the existing circuit.
- 37) The system shall support creation/deletion/modification of NE level constraints during activation.
- 38) The system shall highlight dropping and/or capacity constraints if path computation failed.
- 39) The system shall consider the card capacity rules during provisioning.
- 40) The system shall support creation/deletion/modification of card capacity rules.
- 41) The system shall support topology-based path computation.
- 42) The system shall support bulk provisioning of more than one circuit.
- 43) The system shall provide capability to do ring/link optimization by checking free ports in same node/card and suggest possible optimization & take action accordingly.
- 44) The system shall support creation of business & global rule with admin approval.
- 45) The system shall provide Network planning & capacity optimization tool to study the following in study/ planning mode of the application:
 - i. Present network scenario for network understanding
 - ii. Planning tool shall have provisions for creating scenarios & creating savecases with version provisioning for State/ Area & Regional networks.
 - iii. Communication Network Capability assessment.
 - iv. Traffic forecasting based on past trends.
 - v. Network planning for fulfilling present services requirements.
 - vi. Exercising different options for network study

- vii. Simulation with real time network snapshots for planning and optimization function in Testing and Development environment.
- viii. For Planning and Optimization activities, the proposed changes have to be implemented in Test & Development environment before deploying in production.
- ix. Development Model hosted on Development server of the UNMS system shall be exact replica of Real time Communication Topology being used in Production environment. This development server shall also be used for Training Purpose as Training simulator.
- x. Tool shall be deployed at main CC

2.3.4. Fault Management (with Analytics and Trending)

- 1) Fault Management (along with RCA, Service Impact Analysis (SIA) & Network Impact Analysis (NIA)), shall be implemented for the entire Communication System under scope. It shall provide real-time monitoring and notification to allow engineers to handle alarms/events as they arrive.
- 2) The solution should display the current network status in a selected geographic area. The colors of the icons shown on such a display should reflect the current worst alarm status of the underlying elements. Initiating an action against an icon should cause a “zoom-in” to show progressively more detailed views of the individual lower-order entities that comprise the icon.
- 3) The System Fault Management solution shall provide network engineers a global view of their networks and enable them to activate management functions and operations from single or multiple workstations.
- 4) The FMS window shall display end to end circuit diagram in a graphical fashion highlighting the affected section.
- 5) For the purposes of this document, an event is defined to be an unsolicited message from a network element and an alarm is defined as a type of event that indicates that there is some kind of fault on the network element that emitted the event.
- 6) Any fault in FMS window should be graphically represented into other modules such as Discovery, etc. i.e. if there is any fibre cut in the network, affected section/link should turn RED into the graphical topology/circuit view.
- 7) User privileges and rights should be decided as per requirements of Employer. All activities carried out by any user should be captured in the log. There should be no constraint on no. of users that can be created on FMS window.
- 8) The System shall provide facilities that enable the states of services and bearer circuits to be monitored.
- 9) The System shall enable individual services and circuits to be mapped to the network facilities that carry those services and circuits.
- 10) Root-cause domain, in which a selected set of current root-cause alarms is displayed in tabular form. Selecting an alarm and invoking an action against it should show the alarms that contributed to the raising of the root-cause alarm.

- 11) Service-state domain, in which the states of a selected subset of services are displayed. Invoking an action against an alarmed service should show the alarms that contributed to the service being alarmed.
- 12) Circuit-state domain, in which the current state of selected (generally high-speed) bearers is displayed. Invoking an action against an alarmed circuit should show the alarms that contributed to the circuit being alarmed and the services that are affected. .
- 13) The System should provide a high-performance engine to meet the requirement of the integrated alarm system, which can guarantee the normal running of the integrated System especially when the event storm occurs in the network.
- 14) Alarms arriving at the System shall be transformed into a common format prior to processing by the System. The System should use the common alarm format in all internal System data stores, and in engineer displays, so that external applications that need to process alarms will only have to deal with a single format, and operations staff will see only one representation for all alarms from all network element types.
- 15) The common alarm format supported by the System shall contain at least the following information: -
 - i. Event type.
 - ii. Managed object identifier.
 - iii. Date and time of alarm emission.
 - iv. Perceived severity.
 - v. Probable cause.
 - vi. Notification identifier or correlated notification identifier.
 - vii. Specific problem.
 - viii. Label / Native EMS Name of the Managed Object
- 14) The System shall provide a comprehensive alarm correlation facility which shall be used for following primary purposes: -
 - a. To determine the root-cause underlying sets of alarms and report the root-cause as a single alarm.
 - b. To assist in reducing the number of alarms seen by engineers to the minimum necessary to effectively manages the network.
 - c. The correlation function shall correlate large number of alarms to identify the underlying problems affecting the network equipment.
 - d. The function shall be used to automate network management tasks. In particular, it shall be used to perform high-level automated actions for Alarm filtering, Alarm aggregation, Alarm enrichment, Root cause analysis and Service impact analysis.
- 15) A complete, practical and high-efficient fault association analysis system should be established to meet the network event correlation requirement. Perform automatic association analysis to intra-network or cross-network faults through establishing an association model; assist the network maintenance personnel to correctly analyze and locate the reason for fault events in the shortest period; and establish the association

between NE faults and service faults. Thus, the degree of influence on the service can be known in the shortest time and the influence state of service faults can be rapidly located through the association analysis engine.

- 16) If network events occur, the system should be able to implement the association between these events and the asset/inventory management system in real-time.
- 17) The system shall obtain the related equipment asset/inventory information and related operation personnel information, add the inventory information into the alarm information and display the contact information in the FMS window. Thus, the monitoring personnel can timely notify the related personnel of these faults and the operation personnel can perform troubleshooting rapidly.
- 18) Working together with the related external network association model database, the system should be able to analyze and locate the cross-network alarm for intra-network and cross network faults.
- 19) Sending a message (by e-mail or SMS or PUSH notification on mobile App) to notify maintenance personnel about the fault.
- 20) During network build activities, such as constructing a new trunk route or provisioning a new circuit, alarms may be raised that are irrelevant to the proper functioning of the network. These alarms may be referred to as “build alarms”. The System shall provide facilities that will enable it to identify build alarms and suppress them.
- 21) The System should enable engineers to request suppression of alarms from a particular managed object, or a group of managed objects or an entire managed network element. Alarms from those objects that are marked as “suppress” should be logged but not passed on for handling.
- 22) The System shall be able to recognize duplicate alarms by comparing incoming alarms to those already in the current problem list for the reporting object, based on one or more alarm attributes (for example, object name and notification identifier), and automatically suppress such alarms.
- 23) The system shall allow resynchronization of the System alarm status to the current status of the managed equipment.
- 24) The system shall generate alarm for any synchronization issue. It should also report for services affected due to synchronization in network.
- 25) It shall implement a remedy that eliminates any alarm status discrepancy that may have occurred during operation between the alarm status as presented in System and the real equipment status
- 26) Alarm resynchronization may be necessary in situations such as:
 - i. Equipment failure preventing alarm reporting (for example, disconnection, power failure, hardware defects).
 - ii. Mediation device failure preventing alarm reporting.
 - iii. Data communication link failure.
 - iv. Equipment registered for the first time but starting with one or more initial alarms.
 - v. Human errors in operation of equipment or System

- 27) There is a requirement to log alarms at the alarm-handling level. The alarms saved shall be used for statistical analysis of alarm handling behavior, but they may also be used for availability discrepancies/ any dispute resolution and may be kept for 7 years.
- 28) The function shall handle ISO-formatted alarms (notification events defined in the ITU X.733 & X.736 Standards): Communications Alarm, Quality of Service Alarm, Processing Error Alarm, Equipment Alarms and Environment Alarm.
- 29) The function shall handle both notification type events (notification events defined in the ITU X.733 & X.736 Standards) and configuration type events (configuration events defined in the ITU X.730, X731 & X.732 Standards) raised by equipment or applications. The stored alarm records shall be made available to, and managed by, other System applications in real-time.
- 30) The “terminated” alarms shall be exported to a database for further user-defined processing.
- 31) The System shall be able to automatically clear an outstanding alarm when a corresponding clear-alarm is received (corresponding means that the managed object name and the notification identifier are the same in both the alarm raise and the alarm clear, and that the clear was emitted temporally after the raise).
- 32) The U-NMS shall monitor its connections with EMS/NMSs and Network Elements and raise an alarm if a connection fails. Such an alarm should be automatically cleared when the failed connection is restored.
- 33) When a connection to an EMS/NMS or network element is restored after having been lost, the system shall initiate a resynchronization operation with the EMS/NMS to refresh the alarm states held by the system. The alarm reported during resynchronization shall be reported by exception.
- 34) The System shall enable engineer-initiated resynchronization of alarms with selected managed objects, network elements or EMS/NMSs.
- 35) The System shall support at least the following alarm states (or their equivalents by other names): -
 - a. Raised (an alarm has been raised but not yet acknowledged)
 - b. Acknowledged (an operations staff has acknowledged that they have seen an alarm).
 - c. Handled (handling of an alarm has been started).
 - d. Cleared (the condition that caused an alarm to be raised has been cleared).
 - e. Archived (an alarm has been archived and is eligible to be purged from local storage).
- 36) The System shall support multiple alarm-display domains. It shall be possible to apply filters to each alarm-display domain, so a given domain shows only a selected subset of the total list of outstanding alarms.
- 37) The System shall support a state-change operation to bulk of alarms (for example, if 10 alarms are selected and the engineer invokes an acknowledgment operation, then the states of all selected alarms should be set to acknowledged).

- 38) Some network element types emit certain alarms that are outstanding only for a short period of time (typically less than five seconds, but the period can be longer or shorter) before a corresponding clear alarm arrives. These alarms are called “fleeting alarms”. The System shall provide facilities that will enable it to identify fleeting alarms and suppress them before they are passed to alarm handling.
- 39) The System should maintain a “master alarm” for each managed object reporting fleeting alarms. The master alarm should contain a count of fleeting alarms received from the reporting object, and the count should be incremented each time a new fleeting alarm is reported by that object
- 40) Each alarm-display domain shall be implemented as a Graphical User Interface (GUI) that is intuitive to use and will require minimal engineer training time.
- 41) The alarms displayed in all display domains shall be color coded (customized as per employer requirement) on the basis of perceived severity.
- 42) Engineers should be able to define their own individual set of data that is to be reported against alarms (for example, some engineers may want to see the additional text of alarms, while others may not). Engineer shall be able to append one or more notes to a selected alarm or group of alarms.
- 43) Engineer notes should be able to be long enough to contain substantial amounts (minimum 500 words) of information that may be passed between groups during fault resolution.
- 44) The system shall be able to classify the services as fully affected or degraded based on the shape of the circuits.
- 45) At a given point of time, the system shall be able to list all affected or degraded services in a separate UI with their corresponding root cause alarm.
- 46) The system shall be able to show all the lower order trails that are affected when the corresponding higher order trail has failed
- 47) The system shall be able to list the services for every topological link or network element that will be affected or degraded when this element goes down.
- 48) The system shall be able to update the results of SIA while receiving the faults from the network
- 49) The System Notify Function shall support manual or automatic forwarding of notifications via SMS, email. It shall support forwarding of selected alarms to individuals based on configured notification settings.
- 50) The system shall take into consideration all standard protection mechanisms while computing the RCA.
- 51) The system shall be able to modify the RCA results on receiving every/new alarm from the network.
- 52) The system shall be able to compute the RCA and related SLA within 3 minutes from receiving the alarms for at least 95% of alarms received.
- 53) The System shall have the capability to simulate an alarm in the database and identify the related services, which are affected based on the alarm raised.

- 54) The system shall have the capability to handle volume of alarms as per relevant Appendices of the specifications.
- 55) The system shall have capability to correlate and display the relationships across Root Cause and Impacts as a hierarchy across the network / service objects as shown (but not limited to) below:
- i. Correlation within SDH Layers - The system shall have the capability to correlate the impacts of failure of one of more of the following SDH layers riding over them
 - a) STM-n Links to VC4
 - b) VC4 Server Trails to VC12 / VC3 Trails riding over them
 - ii. Correlation from SDH to EoSDH layers - The system shall have the capability to correlate the impacts of failure of SDH Layer to the EoSDH VCG Server Trails encapsulating them
 - iii. Correlation within EoSDH Layer - The system shall have the capability to correlate the impacts of failure of GFP/VCG Layer to the Ethernet Services riding over them
 - iv. Network to Passive Objects Correlation – The system shall have the capability to correlate the impacts of failures of the Passive Infrastructure Objects to the Network Objects using such infrastructure
 - a) Cable to Link failures
 - b) Site / Location to Network Element Failures
 - c) Auxiliary system alarm
- 56) Consolidated Fault management system should enable operators to Identify hot spots and frequently occurring events with guided search based on best practices. The search should be based on key words and should fetch data from real time as well as historical events for empowering operators with relevant and quicker Root Cause Analysis.
- 57) The system shall have report generation facility for RCA and alarms elementwise, link/service wise/ port wise/network wise say regional, states etc.

2.3.5. Analytics & Intelligence:

There shall be an in-built Intelligence in the system. The system shall be able to analyse the trends of various fault in the system and build intelligence out of it. The system shall maintain a “Known Error Database” (KEDB). U-NMS should be able to make trend based on the past behaviour/pattern of the communication system and shall generate predictive reports for quick fault detection and restoration and early warning for fault occurrence. The intelligence built within the system shall be re-validated/updated on a 3-monthly basis, based on the past system behaviour for more accurate prediction such as:

- i) Anticipated errors/early warning
- ii) Inventory details/depleting stock
- iii) Best alternate path
- iv) Redundancy Requirement
- v) Anticipated Congestion path/ Remedial action

The system shall also highlight through learning and Data collection about critical nodes, critical Path and area of frequent failure. U-NMS should also highlight area/nodes, where faults are occurring frequently, or the faults rectification time is high and should suggest remedial action. Typical Business Rules related to the system is provided at relevant Appendices of the specifications.

U-NMS with its intelligence should be able to minimize alarms/ faults occurrence in the system.

2.3.6. Link/Channel/ Service Availability

The system shall be able to correlate alarms/ node performances such as signal strength of the node and generate link/channel/service availability status for region/state/network.

2.3.7. Performance Management System (PMS)

- 1) Performance Management Tool shall be agnostic to technologies and vendors.
- 2) The System shall collect performance data from all network elements that support performance data production, but collection shall be able to be turned on or off per network element or per managed object (if supported by an EMS/network element combination).
- 3) The System should allow performance data collection schedules to be defined per network element or per network element type or per NMS/EMS, with the schedules able to be programmed by operations personnel.
- 4) By default, 24-h Customer's performance data shall be collected from all collection enabled network elements every day, but operations personnel shall have the ability to select 15 minutes performance data collection for nominated network elements, with a correspondingly shorter collection period.
- 5) Some EMS/NMSs do not support real-time collection of performance data: collection is run as a batch task on the EMS system. The System should pick up such performance data using some mechanism such as ftp or alternatively may collect performance data directly from NEs.
- 6) The System should poll the Performance Management (PM) data to be collected from the EMS/NMS for the PM Points (Layer Rate/Location/Granularity/Parameter) including all the KPIs supported by the EMS/NMS for all the enabled ports (PTP-Physical Termination points)/CTP Circuit Termination Points) at regular scheduled intervals.
- 7) The System should raise a critical alarm if a performance data collection operation fails.
- 8) The System should enable performance thresholds to be set on a per managed-object or per-managed-object-type basis, with hourly, daily and weekly settings available.
- 9) The System should raise a performance alarm if a nominated performance threshold for a managed object is exceeded and the Tool shall have capability to forward a Threshold Crossing Alert (TCA) to the appropriate system.

- 10) The System should be able to collect service-performance information for service level management purposes.
- 11) The System should be able to collect network-performance data that can be used by engineering groups for planning and maintenance purposes.
- 12) The System should be able to detect pending network problems that is signalled by network elements in the form of error reports.
- 13) The System shall provide facilities that will enable the performance of individual services and circuits to be monitored.
- 14) Customized reports based on service, link/circuit, region, technology, vendor etc. should be possible.
- 15) If User selects any OEM, no. of erroring ports should be displayed. On selecting the port, PM data should be displayed and if required may be compared with previous day.
- 16) Comparing of PM data of ports/service/circuits etc. should be possible in the same window.
- 17) Raw performance data (as collected from network elements) shall be stored online for a programmable time as per relevant Appendices of the specifications from the date of collection.
- 18) In the future, the System may be required to pass performance data periodically to external data mining/warehousing applications. Bidder should describe the facilities that are available to export performance data to other applications.
- 19) System shall provide a reporting capability that will enable Employer to create comprehensive performance reports from both a network and a service viewpoint, both as an aid to seeing failure trends, but also as an aid to network capacity planning.
- 20) The System shall enable performance reports to be created in hard-copy form, or viewed via a web-browser interface. A suitable browser “plug-in” shall be provided to enable browser-based viewing of performance graphs.
- 21) The System should enable inexperienced users to access pre-defined performance reports, with more experienced users able to derive new reports based on existing predefined reports.
- 22) The System should enable suitably trained Operations personnel to define new reports and save the report definitions for other users to access.
- 23) PMS should be integrated with various modules such as IMS, Discovery, FMS, RCA, etc.
- 24) Performance management (PM) operations such as - enable PM, disable PM, set TCA, retrieve PM enabled entity, get PM reports - historic/current needs to be supported by the tool to perform PM operations on the network via EMS/NMS/NEs interfaces of various vendors. PM tool own operations shall include PM report generations - service/network, database management functions - archive/restore, user management.
- 25) PM tool shall support GUI based reporting using Web Interface. The reporting capability shall be less than 10 sec processing time for every 1000 rows of data fetched for any type of report with 100 concurrent users accessing the PM tool. Web Interface

shall support all PM operations directed towards EMS/NMS/NEs and tool own operations beside PM reporting. Reporting engine is key element of the PM tool where user needs periodic/scheduled and on-demand reports.

- 26) The PM tool shall be highly scalable and reliable for its database performance, GUI performance, PM operations to EMS/NMS/NEs and scheduled reporting. Multiple operations shall be supported concurrently.
- 27) The tool shall support the Offline and Online mode of operations. The online means it is connected to EMS/NMS/NE systems of various vendors. Offline means it is working on its own database copy. This will allow performance management statistics can be generated offline when needed and online version is used when database synchronization is required between PM tool and EMS/NMS/NE systems.
- 28) Tool shall have built-in intelligence of service/ circuit end to end connection detail i.e. Port, NE ID along with path detail. The details shall be available by integrating with Inventory System
- 29) Tool shall provide the ability to enable / disable performance monitoring on a per Port, Card, NE & services basis. It shall also provide the ability to enable/disable monitoring on a bulk basis.
- 30) Tool shall have not any limitation on TPs (Terminating Points) for enabling of PM for 15min/24Hrs counters.
- 31) Tool shall provide a facility of real time data extraction from NMS/EMS/NEs/objects.
- 32) Tool shall report the events where immediate action is required, based on user defined threshold, on a real time basis
- 33) Tool shall facilitate history PM report extraction, summarized by time –Hour, Day, Week, Month, Quarter, Year and by Property- service, circuit, location, Node etc.
- 34) Tool shall have capability of exporting report in Excel in user defined tabular format & same shall be displayed graphically.
- 35) Tool shall act as a Unified source of information for all performance related queries by the users. It shall support comprehensive set of performance reports for Multivendor equipment on one single platform at all layers viz. MS/RS/HO path/LO path/Ethernet etc.
- 36) Tool shall have capability to retrieve and report performance-monitoring data both on request and as per schedule.
- 37) Tool shall provide PM Report with Zero suppression, removing all the rows with complete zeros (rows with no data) so as to effectively present only non-zero rows.
- 38) Tool shall provide option to integrate with Trouble Ticketing System and Power Level/Current parameter of SFP shall be reported to Ticketing System, before and after restoration of Cable Cut, Partial cut or any failures.
- 39) Tool shall provide consolidated report of span loss for each section as compared to the designed parameters & reporting deviations, if any. It should also keep record of all old span loss (section wise) data in online/archive form.
- 40) Tool shall provide Proactive Error Reporting/Trending for comparison of the vendor provided threshold value and the actual FEC error values observed on the network.

- 41) Tool shall be capable of providing Report for all the ports in the network generating/detecting errors as per defined PM parameters.
- 42) Tool shall provide analysis report of repeat cases (ports/services) on a user defined interval
- 43) Tool shall be capable of providing report for trend analysis of performance on individual service/ circuit/ port.
- 44) Tool shall have capability of service degradation correlation with the anomalies detected/reported at higher network level carrying the service. Tool shall also have capability of user defined correlation rules.
- 45) Tool shall provide Service/Circuit Level Fault Analysis Report to identify the root cause of faults/errors occurring on a particular Circuit/Service id.
- 46) Tool shall be capable of providing end to end service performance monitoring reports for individual circuit/service along with associated bandwidth, end points, node name etc.
- 47) Tool shall provide compute the Service Availability based on the occurrence of the UAS for the PTP/CTPs associated with the service monitored for PM. The service monitored for PM shall be considered down (Not available) for the duration of UAS observed in the PMS.
- 48) The performance monitoring system can be started/stopped ON Demand basis. There should be an option to keep default performance monitoring ON or OFF.
- 49) Tool shall have ability to enable users to do audits by generating periodic reports on user settable specific parameters such as group of NE's, circuits, services, ports, sites, operations regions and others.
- 50) Tool shall enable limitation to access performance reports, based on the user rights.
- 51) The system should be able to dump Performance data to an external system for external analysis purpose. User should be able to specify the period of the data to be dumped for a specific parameter for complete data as per industry best practices.
- 52) The system should be able to generate reports for all performances in terms of availability of NE/link/channel/port/NMS/Server/Application/complete system delivered on all parameters.
- 53) El level, Ethernet level and Optical level performance shall be available in the proposed UNMS

2.3.8. Trouble Ticketing & Web Portal System

This application will continuously monitor the Network for alarms/events and filtered critical alarm/event shall be reported as a ticket to UNMS Centre who shall acknowledge the same for resolution

2.3.8.1. Trouble Ticketing (TT) System:

- 1) Effective UNMS Centre operations shall be established based on the IT Infrastructure Library (ITIL) v3 with minimum five analyst to handle incident management and

change management. Industry best practices shall be followed ensuring all cyber security standard.

- 2) The following are the processes that will be tracked part of the trouble ticketing services in this section:
 - i. Incident Management (Service Monitoring and User Complaint)
 - ii. Complaint Management
 - iii. Problem Management
 - iv. Change Management
 - v. Knowledge Management
 - vi. Release Management
- 3) Configurable rules like routing and auto assigning will be supported by the Ticketing system.
- 4) The System shall notify the network alarm to create a Network or Event Trouble Ticket (TT) automatically. Network Alarms shall be correlated and prioritized with severity levels to create or update a TT. TT shall be notified to the UNMS Centre who shall accept it to service. Automatic Event TT creation shall import the properties of the alarm such as type, cause, network, network resource, source (managed object where the Event/Alarm occurred).
- 5) The TT should provide the ability to define priority, severity and impact for the tickets.
- 6) The system shall create an Incident ticket due to the service/circuit outage or degradation (Incident ticket shall be marked Service wise). SMS alert facility for service link down shall be deployed.
- 7) The system shall update the incident ticket upon more alarms on the same service. Service level RCA shall be applied prior to ticket creation to avoid flooding of tickets and thereby differentiate & identify multiple incidents appropriately.
- 8) Ticketing system shall support standard and custom reports of tickets, based on SLA, Ticket statistics and ticket execution for different ticketing queue.
- 9) TT escalation should be supported for availability “about to be breached” and “availability breached” cases for all severity and all high and critical tickets.
- 10) Ticketing system shall show ticketing analytics that will result availability and severity based ticket resolution analytics report.
- 11) Format of Trouble Tickets (TT) shall be configurable in a flexible way. Several formats of TT should be usable in parallel.
- 12) TT shall be generated in one of the following ways:
 - i. Automatically by Resource Trouble Management based on an alarm in the network
 - ii. Automatically based on predefined schedules for planned maintenance activities
 - iii. Manually by Users of the UNMS Centre and authorized personnel.

- 20) It shall be possible to configure filters that prevent the automatic creation of TT.
- 21) Every TT must have an owner. Ownership of a TT will not change during its lifetime unless ownership will be manually assigned by authorized personal. TT owners shall be role or function based.
- 22) Owners (roles, functions) must be linked to users (individuals).
- 23) The solution shall manage the automatic hand over of TT from one user to another (e.g. in case of shift changes).
- 24) The solution shall provide freely configurable roles. The supplier shall specify the default roles supported by the system.
- 25) The System shall support manual and automatic escalation within set levels and notification of trouble tickets both internally and externally (e.g. to vendors and other carriers) based on:
 - i. TT elapsed open time
 - ii. TT remaining open time
 - iii. Resolution status
 - iv. Availability thresholds
 - v. Others
- 26) The escalation process must be user configurable.
- 27) The system shall provide views to tickets already existing for the service associated with the user and thereby avoid duplication of incident tickets.
- 28) The system shall allow modification of ticket on selected parameters.
- 29) Inputs for trouble ticket shall be
 - a) Type of Failure:
 - b) Traffic Impact: Traffic affecting, Non-Traffic affecting
 - c) Severity: S-1 till S4 (Minor, Major and Critical)
 - d) Suspected Problem:
 - e) Affected Traffic:
 - f) Brief Fault Description: User will describe the fault (Text Box)
 - g) Documents: User can attach required Files
 - h) Submit:
 - i) Vendor Ticket Number:
 - j) Date:
 - k) Time:
 - l) Trouble Ticket Submitted By:

- 30) UNMS Centre will close the trouble ticket after resolution & provide “Reason for Outage” RFO in case of service outages. Provision shall be there to rate individuals based on AMC performance.
- 31) The system shall provide users acting on a TT (auto & manual) to annotate a message for the same. User with authorized privileges shall only be able to act on a TT.
- 32) The system shall allow authorized users to resolve the TT. Operator shall provide the resolution comments while resolving the TT. TT shall be either Cleared or Cancelled while resolving the ticket. All resolved TTs shall be in CLEARED state. On receiving an automatic network alarm clearance, the alarm shall be correlated to update the TT that was created. On subsequent verification of the alarm the TT shall be updated as CLEARED.
- 33) The system shall allow authorized users to choose multiple TT to resolve the ticket with the same resolution. (e.g. Tickets that are linked)
- 34) The system shall provide option to close or re-open the cleared ticket on user confirmation.
- 35) The system shall record all tickets OPEN/CLEAR/CLOSED and other WORKLOG activities such as acknowledgement etc. as TT history for Service Level/KPI computations and past data analysis. TAT (Turnaround Time) shall be calculated from the time of TT creation to its resolution.
- 36) Concurrent ticket creation shall also be supported for simultaneous troubleshooting. Parent / Child ticket approach shall be allowed to support the same. Until all child tickets are closed/cancelled, parent ticket shall not be allowed to closed
- 37) The system shall track the ticket status based on a unique TT id.
- 38) The system shall maintain the Known Error Database (KEDB) updated by authorized operators for tickets resolved with new design/solution. KEDB allows operators to look up the past resolution steps/solution design to resolve and fix the issue tickets.
- 39) KEDB shall have creation and latest update/lookup dates. The system shall update the KEDB upon resolution of the problem with root cause and resolution steps taken.
- 40) The system shall create problem tickets if the incident ticket does not resolve the root cause of the outage or degradation. Incident may have been resolved through an intermediate or workaround solution but the problem ticket shall be maintained as a new ticket and tracked for permanent resolution and avoid the reoccurring of the incident.
- 41) TT logs shall be periodically purged from the database. (TT shall be purged on a yearly basis) from online system to Archive and to be kept for a longer duration as specified in relevant Appendices of the specifications.
- 42) The system shall provide Web based tabular views for the active tickets and past TT history (also includes Network / Service Alarm details part of TT information).

- 43) The system shall provide a web-based interface for users to create/update/close the tickets. The ticket should also be viewed/create/update from mobile App. PUSH notification should also be issued to respective maintenance engineer for rectification.
- 44) The system shall allow user to configure TT views based on user define filter criteria.
- 45) The system shall provide filtering, sorting and search utility to locate specific TT in the view pages.
- 46) The system shall provide views for the KEDB and Problem tickets maintained in the system with filtering, sorting and key word search utility.
- 47) The system shall provide summary counter view across all events/incident/problem tickets against severities. Requirement of summary counter view is to have KPI's to be reflected on dashboard/ console reflecting the summary in terms of count of open Priority 1, Priority 2 tickets and so on and in progress Priority 1, Priority 2 tickets and so on.
- 48) The system shall provide ticket views/operations that shall correlate the tickets that are linked.
- 49) The system shall provide users to export the TT data to XLS or PDF and any other required format.
- 50) Message system broadcast - Email communication and Message Board on the Portal part of trouble ticket updates shall be supported
- 51) The system Email System shall be linked with TT functions for auto or manual notifications.
- 52) The system shall provide separate view or color coded indicators to track a ticket that has violated the KPI for TAT on ticket resolution.
- 53) The email and SMS notifications triggered from the ticketing system should reach the Users as per escalation matrix within less than 60 seconds.
- 54) Total time for Ticket creation after submission should be less than 10 seconds.
- 55) Average report generation time should be less than 30 seconds.
- 56) For qualified search criteria, search results should be fetched within stipulated time of less than 20 seconds for each 100 results.

2.3.8.2.Web portal system:

POWERGRID intends to provide a web portal for its Users with proper security in place to monitor status of their services and availability parameters. User should also be able to raise ticket for issues/problems/faults in their services/circuits and can get update on their tickets. SMS & Email alters shall also be provided to the User for update of ticket status and on resolution of their tickets. Contractor shall supply, install, commission,

Integrate & test required solution including application Software, OS & hardware for implementation of the same under the proposed solution. The system shall have at least following capabilities:

- 1) It should be able to handle 200 concurrent users.
- 2) The user shall be allowed to login only after authentication of credentials provided to him.
- 3) The solution shall be integrated with relevant UNMS modules, AAA/radius server, Trouble ticketing System, Service Assurance solution etc. for publishing routine availability & performance report, network details etc. of the communication system to be finalized during detailed engineering.
- 4) The solution shall be housed in appropriate zone within the CC to ensure all security aspects including data & application security as per applicable DOT/ MOP latest guideline.
- 5) All reports as desired by Employer should be available on Web portal.
- 6) Domain to be procured by the Employer and integrated with the U-NMS system, however, the Web portal should be designed and maintained by the Contractor.

2.4.Unified UNMS Console (Common Reporting & dash boarding System)

2.4.1. Generic

- 1) Unified U-NMS Console shall be single presentation layer across fulfilment and assurance stack. All applications such as Order & Inventory/Discovery Management, Configuration Management, Fault Management, Performance Management, Trouble Ticketing, SLA Management, Reporting and Dashboards etc. should be seamlessly interconnected and available in single window, single URL with single user authentication.
- 2) Other than Unified Console, users will not refer to any other application window for any assurance and fulfilment, reports and dashboards or any other application.
- 3) Unified console should support single window for Alarm Management, Root Cause analysis, Service Impact analysis, Auto and Manual Ticket creation, Ticket update, ticket resolution, SLA calculation and escalation, Inventory/Discovery view and update, Order Management, Performance Reports, report creation and execution, dashboard creation, update, automatic refreshing, outage/planned maintenance etc.
- 4) The Unified console User Interface should be built on latest technology /version as on date of bid opening and should be rich in graphics and flexible for quick aesthetic changes.

2.4.2. User Management for Unified Console

- 1) Access of different U-NMS applications has to be governed by user privileges in respective console/application and user shall only be able to access the applications he is authorized to access, along with defined role in the application.
- 2) Administrator should be able to create, delete and modify users and their privileges.

2.4.3. Integration Requirements for Unified Console

- 1) The Unified Console should be able to integrate on standard protocols/APIs with multi party U-NMS/other CC and related systems for common presentation layer.
- 2) Console should have built in plug-ins for quick and easy integration with 3rd party databases, applications, dashboards (View import).

2.4.4. U-NMS Console on Mobile/Handheld

- 1) It is required that centralized U-NMS system should be fully compatible with different types of mobile/handheld/tablet devices offering functionalities of Dashboard, Reports, Tickets, and Alarms.
- 2) The mobile/handheld views should be fully customizable to meet specific end user requirements as finalized during detailed engineering.
- 3) All the functionalities of U-NMS console should be seamlessly available on smart mobile phone with Android, iOS and Windows platform, without any additional software or hardware on server side.
- 4) The users interface for mobile devices has to be pre designed with proven deployment references in the similar environment.
- 5) Sufficient control over user / device specific access (like MAC /IP range-based access etc.) of console on mobile application.
- 6) U-NMS applications should have a separate tabs in mobile view of U-NMS Console, and all functionalities of each application should be available within mobile view also.
- 7) U-NMS should support PUSH notification for the alerts as desired by Employer.

2.4.5. Dashboards

Dashboard shall visually track, analyze and display Key Performance Indicators (KPIs), metrics and key data points to monitor the health of the network, availability of links/channels/services, bandwidth & network usage etc. This shall consolidate and arrange numbers, metrics and sometimes performance scorecards on a single screen. This shall be customizable for a specific role and display metrics targeted for a single point of view as per requirement of Employer/Owner. The dashboard shall include a customizable interface and the ability to pull real-time data from multiple sources.

- 1) Dashboard shall be integrated with all applications and shall be extendable to systems such as Trouble Ticketing, Service Provisioning, Service Activation, Inventory System etc. as required.
- 2) Dashboards shall automatically update at least once every 5 minutes and customizable as per needs.
- 3) Dashboards shall be drilled down to specific network and service component.
- 4) Allows modifying and creating new views in a few clicks with the View Designer and make changes available dynamically across the production environment.
- 5) The common U-NMS console should also offer statistical analysis of real-time and historical data such as alarms, trouble tickets etc. for the purpose of trend, seasonality and CC surveillance efficiency.

The system must offer set of inbuilt statistics such as:

Network Health Dashboards

- a Number of alarms
- b Number of alarm occurrences
- c Number of Known Managed Objects
- d Cumulative Alarms In Fault Duration
- e Distribution of alarms per Optical Carrier (OC) and per domain
- f Top 10 Failed or Problematic Equipment Classes
- g Top 10 Failed or Problematic Equipment Parent Entities
- h Distribution of Affected Objects (AOs) per severity, per alarm type
- i Top 20 probable causes
- j Performance Comparison make wise (Tejas/ECI/Fibcom etc.)
- k Comparative State wise availability
- l Comparative AMC performance vendor wise

Network Management Health Dashboards

- m Average Event/Alarm Collection Duration
- n Average Event/Alarm Acknowledgement Duration
- o Average Event/Alarm Close Duration
- p Number of escalated alarms.
- q Top 10 Equipment Classes, in terms of the average and cumulative In Management Duration
- r Alarm Characteristics Distribution
- s Trending and deviation
- t Vulnerable area identification

Fault Management effectiveness

- u Alarm reduction percentage (w.r.t previous three months record)
- v Automatic TT creation percentage
- w The percentage of raw network events filtered out
- x Percentage of post filtered events reduced by the similarity function

- y Percentage of post filtered network events, reduced by the similarity function, correlated by the Root Cause Analysis function

Service satisfaction (for all types of services, e.g. E1, Eth, 64Kbps, VLAN, VSAT, etc.)

- z Mean-Time-To-Resolve Service Impacting Problems
- aa Mean-Time-To-Resolve Non- Service Impacting Problems

Operations & Maintenance responsiveness

- bb Mean-Time-To-Create a ticket
- cc Percentage of problems resolved by due date
- dd Mean Service Problem Resolution Time
- ee Mean-Time-To-Resolve Service problems
- ff Mean-Time-To-Resolve Network Problems

CC staff effectiveness

- gg CC Full Time Equivalent (FTE) Efficiency
- hh Percentage of problems by cause type
- ii Percentage of maintenance time used for repair
- jj Percentage of escalated alarms

2.4.6. Reporting

Reporting system should be producing following reports in mutually agreed formats such as Excel/Word/XML/Pdf etc.:

- 1) Real time inventory and bandwidth utilization reports (Vendor wise, Node wise, Section wise, Service wise, Ring wise, Region wise, Technology wise etc. for complete network).
- 2) Network MTTR/Fault Reports: Yearly, Quarterly, Monthly, Weekly, Daily(Vendor wise, Node wise, Section wise, Link wise, Service wise, Ring wise, Region wise, Technology wise etc. for complete network).
- 3) MTTR violation Reports.
- 4) Circuit Service Level Agreement (SLA) Reports: Yearly, Quarterly, Monthly, Weekly, Daily.
- 5) Service & link/circuit wise SLA Violation Report: Yearly, Quarterly, Monthly, Weekly, and Daily.
- 6) Service & link/circuit wise Performance Reports.
- 7) Percentage, Chart and Graph Options for all Reports.

- 8) Management Information System (MIS) Reports on Capacity Utilization, Service Quality etc.
- 9) Security violation & cyber threat responds.
- 10) Analytics reports such as fault analysis, remedial solution, early warning reports, recommendations etc.
- 11) Maintenance & Outage management reports.
- 12) Adequate security of the extensions (as mentioned above) through internet shall be ensured.
- 13) The reports should be extractable in CSV, Excel, Word & PDF form or any other mutually agreed format.
- 14) Reports shall be made available in the desired format on the website designed for proposed U-NMS with required permission enabling features.

2.5. Generic Integration Requirements:

2.5.1. Integration Points

The Bidder must ensure that UNMS application supports standard internationally acceptable formats, protocols & open standard interface for ensuring the integration with other Employer's systems such as GIS, ERP & SD-WAN (if required by Employer) at a later date but before the expiry of UNMS contract.

2.5.2. Future Readiness

- 1) UNMS will be able to integrate and assure a range of Network Function Virtualization (NFV) solutions from a range of vendors
- 2) Alarm, Auto TT and provide performance data on virtualized network functions as currently done for traditional physical network elements
- 3) Integrate with NFV solution to automatically manage the NFV platform to add / remove capacity dynamically
- 4) Integration with NFV Orchestrators
- 5) Capability to correlate hardware and software alarms to root cause i.e. SD card/SSD/ HDD failures.
- 6) Automate resolution of Virtual Network Functional issues using automated workflows.
- 7) Support for NFV Service elasticity scale-in/scale-out.

2.5.3. User Management

The User Management System shall provide features primarily that consist of the following services:

- 1) Authentication
- 2) Authorization
- 3) Administration
- 4) Audit

2.5.3.1. User Authentication & Authorization

- i. The System shall provide an option for the newly logged in user to change his password and the user shall be forced to change the password first time. It shall also provide option to authenticated user to change password.
- ii. Passwords shall be encrypted and stored in database and will not be stored in clear text.
- iii. Strong Password techniques shall be employed as powerful password login mechanism.
- iv. The System shall provide User account expiry date. It shall be set/modified to the required number of days, once the number of days set for the user account exceeds, the user will not be allowed to log in to system as the user status will be changed as "user Expired". Configuration for the user Expiry shall be enabled or disabled accordingly.
- v. The System shall allow User login to be enabled /disabled.
- vi. The System shall provide Password expiry date and can also be set/modified as number of days after which the user status will be changed as "Password Expired". By default the password expiry is enabled and set for 90 days. Thus when the user tries to log in, then the message "Password Expired" will be displayed and user is allowed to configure a new password.
- vii. The System shall provide a mechanism in which continuously failed login attempts will be detected and controlled. Number of failed login attempts shall be configurable and will default to 5. After 5 failed attempts, the User account shall be locked. The process for unlocking shall be finalized during detailed engineering. The failure attempts and unlocking of User account shall be logged in the user audit records.
- viii. The System Admin with sufficient privileges shall only restore the user access further to failed attempts and shall not automatically allow access.
- ix. The System Authorization service shall control the access limits of the respective logged in users. Authorization shall validate an authenticated user's request and grant/deny him permission to perform a requested operation.
- x. The System Authorization level shall be extensible towards a fine gained security wherein the users shall perform the operations based on the data like location or department.

- xi. The existing Communication nodes & EMS/NMS shall be integrated with AAA/RADIUS server being supplied under this contract.
- xii. The System shall support integration with external user authentication systems with AAA, LDAP, Active Directory or Radius.
- xiii. The contractor may require to integrate with existing LDAP/AAA of Employer within its network else may provide separate servers to install these (AAA & LDAP) functionalities.

2.5.3.2. User Administration

- i. The System shall provide a Super User who shall administrate the system User Groups and its privileges. Super User shall be the system Security Administrator (System Admin).
- ii. The system shall have role-based access.
- iii. The System Admin shall create User Groups as per the profiles with pre-defined privileges.
- iv. The System Admin shall be able to administer user / password of users across all groups and privileges across all user groups.
- v. The System Admin shall have the rights to create users and administer username/password of User Group / Users. Users created shall derive its default privileges as per the User Group created by System Admin.
- vi. The System shall support users belonging to multiple groups.
- vii. The System shall be customizable towards multitenant architecture that allows distributing the secured user administration to select group(s) to administer users within their organization. The System shall support auto generation of password.
- viii. The System shall be customizable towards Two Factor Authentication with OTP (One Time Password) support.
- ix. The System shall send mail notification on key admin transactions like account creation along with first time password

2.5.3.3. User Audit

- i. The System shall provide facility to audit the authentication and authorization related information and stored in.
- ii. Auditing shall monitor the selected operations performed by the user.
- iii. The User Audit trails shall be logged and viewed by authorized security admin, it includes views of the current users logged in and past users logged in/out and the operations performed.
- iv. All authorized operations that are performed are audited and logged in the audit tables.

- v. Any erroneous and suspicious activities like login attempt failures shall be logged and viewed part of audit.
- vi. The system shall provide audit reports on the performed operations with it user information and time stamps.

2.5.4. System Security, Access Control Management System & Audit (CERT-In or other guideline as applicable)

- 1) The supplied system to be certified & tested as per relevant contemporary Indian or International Security Standards e.g. IT and IT related elements against ISO/IEC 15408 standards, for Information Security Management System against ISO 27000 series, Telecom and Telecom related elements against 3GPP security standards, 3GPP2 security standards etc. from any certified lab identified by the Government of India.
- 2) The process of networks Audit and certification must (performed by Third Party/Parties) include following activities (as applicable) during FAT, SAT & AMC:
 - i. Network Architecture Security Review
 - ii. Review/ update of security policies and processes
 - iii. Host security configuration review
 - iv. Network forensics
 - v. Network Hardening
 - vi. Network penetration test
 - vii. Risk assessment
 - viii. Actions to fix found problems
 - ix. Any other required audit as per DoT/MoP guidelines, which has not been specifically mentioned in this document
- 3) The proposed solution should provide secure administrator control, monitor and record privileged sessions including VNC, RDP, SSH, Telnet, HTTP/HTTPS, AS400 and Mainframe.
- 4) The proposed solution should have the ability to support load balancing and active High Availability (HA) out-of the-box to cater for current requirements and future expansion.
- 5) The proposed solution should be able to prevent leap frog attempts, session continuous recording & ideal session time out.
- 6) The proposed solution should allow defining roles or groups for user management. Roles should be customizable and pre-defined in system.
- 7) The proposed solution should be able to support text searching for GUI session logs and records.
- 8) The proposed solution should provide the capability to manage application credential together with access control, password management all within a hardened platform. The product's appliance supports all features: Password Vault, Access

Management, Session Recording, Application to Application (allows dynamic password access from applications), etc.

9) The product's appliance is highly scalable, supporting (for example) 3000 concurrent SSH sessions, 1500 concurrent RDP sessions, or 2000 concurrent connections of mixed SSH and RDP regardless of which form factor (physical or virtual) is used. The product adds scale by simply adding new appliance to a cluster.

10) Solution should provide real time alert for command line and GUI on back listed GUI actions or commands on target end points such as applications, server & command line. It should detect when violations of the rules occur and can automate action as a result including warning the user, logging off the session, as well as alerting when the event occurs.

11) The audit by CERT-In certified auditors in line with DoT/MoP applicable guideline for ensuring system security shall be completed within end of every year during Implementation, warranty & AMC period. The report shall contains at least following:

- i. Audit Report – Executive Summary: The vendor should submit a report to summarize the Scope, Approach, Findings and recommendations, in a manner suitable for senior management. Selected Bidder will also detail the positive findings (No Gap found) for various tests conducted.
- ii. Audit Report – Core Findings along with Risk Analysis: The agency/ bidder should submit a report bringing out the core findings of the audit/ testing conducted for network devices, security devices, servers etc.
- iii. Audit Report – Detailed Findings/Checklists: The detailed findings of the audit would be brought out in this report which will cover in details all aspects viz. identification of vulnerabilities/ threats in the systems (specific to equipment/ resources – indicating name and IP address), identifications of threat sources, identification of Risk, Identification of inherent weaknesses, Servers/Resources affected with IP Addresses etc. Report should classify the observations into Critical /Non-Critical category and asses the category of Risk Implication as VERY HIGH/HIGH/ MEDIUM/ LOW RISK based on the impact. The various checklist formats, designed and used for conducting the audit activity as per the scope, should also be included in the report separately for Servers (different for different OS), Network equipment, Switches, security equipment etc. Snap shots/ Output of any script /documents etc. from where the finding/ observations have been made shall be attached.
- iv. Audit Report - In Depth Analysis of findings /Corrective Measures & Recommendations along with Risk Analysis: The findings of the entire audit Process should be critically analysed and controls should be suggested as corrective /preventive measures for strengthening / safeguarding the Telecom assets of POWERGRID against existing and future threats in the short /long term. Report should contain suggestions/ recommendations for improvement

in the systems wherever required. If recommendations for Risk Mitigation/ Removal could not be implemented as suggested, alternate solutions shall be provided. Also, if the formal procedures are not in place for any activity, evaluate the process & the associated risks and give recommendations for improvement as per the best practices.

2.5.5. Web User Management

- i. The System shall provide authentication of user credential over secured encrypted transmission over HTTPS
- ii. The contractor shall supply required SSL certificates etc. for entire period of contract i.e. from implementation phase till end of AMC (1+6 years).
- iii. The authentication verification shall happen on server side.
- iv. The System shall support User Idle Time session time out for the web session if it exceeds a user defined (configurable) limit.
- v. The System shall provide logout that will close the session and close all cookies on the browser.

The contractor shall be responsible for secure access of web portal from internet without any security threat and provide necessary infrastructure to ensure the same. If required separate hardware may be provided for providing web access from internet and restrict the data exchange from external world.

2.6.IT Setup

An IT infrastructure is envisaged at each UNMS server location to enable publishing various applications such as Web portal System, Trouble ticketing etc. to be used by while on site. Other applications like DNS, Email servers etc. are also to be placed within this setup. Different zones shall be created for hosting different applications within this setup for ensuring system security.

This setup shall be designed such that redundancy & replication of all applications shall be maintained with proper backup. The following components are to be included in this setup.

2.6.1. Reverse proxy

To publish portal and applications on internet using reverse proxy server is to be supplied. The proposed reverse proxy server should have following minimum functionalities:

- 1) Throughput - 5Gbps
- 2) Ports required – 2x10GE + 4x1GE
- 3) WAF (Web Application Firewall) capability
- 4) SSL Encryption with SSL acceleration hardware

2.6.2. Server Load Balancer (SLB)

SLB is required for managing redundancy between applications & database hosted at main CC & back-up CC. All the applications offered under this project shall use this facility subject to the application & database internal architecture failover design. The same shall be finalized during detailed engineering. Contractor shall size the SLB such that it should be able to cater the requirement of redundancy for all applications & Database supplied under this project.

Server Load balancers are not mandatory. Bidder can offer a Solution Architecture that meets the end objectives without Load Balancers. However, if the bidder proposes a Server load balancer it should meet following minimum specifications.

- 1) The port density shall be as per implementation design finalized during detailed engineering & project execution considering expandability.
- 2) Following Server Load Balancing Topologies should be supported:
 - i. Virtual Matrix Architecture
 - ii. Client Network Address Translation (Proxy IP)
 - iii. Mapping Ports
 - iv. Direct Server Return
 - v. One Arm Topology Application
 - vi. Direct Access Mode
 - vii. Assigning Multiple IP Addresses
 - viii. Immediate and Delayed Binding
 - ix. IP Address Ranges Using imask

The Server Load Balancer (**SLB**) should support the below metrics: -

Minimum Misses, Hash, Persistent Hash, Tunable Hash, Weighted Hash, Least Connections, Least Connections per service, Round-Robin, Response Time and Bandwidth

2.6.3. Antivirus Software

The antivirus software shall be enterprise class along with latest version of software. The software should be upgradable to latest virus definitions on periodic basis. The license should be considered for the contract lifetime.

2.7. Development System as a Test Bench and as a Training Simulator system

The development systems shall include all functions required to support the generation and testing of the system software, database, displays and reports. The development system shall

also include tools to acquire data from existing NMSs and independent NEss under test mode.

Development system shall be able to provide testing facility for integration of new Patches, displays, integration with other NMS/UNMS/NEs or any other changes in the UNMS system before putting it online with Real-time system.

- This system shall also be used as a Test bench for Cyber security and shall accordingly be equipped with firewall, antivirus and enable mode wherein threat scenarios can be tested with configured security elements before implementing on the main/production system.
- This Test bench for Cyber security shall also be used for VAPT (Vulnerability Assessment & Penetration Tests) e.g. OS fingerprinting, Port scanning etc.

In test bench mode, Development System shall be able to connect through the existing LAN/WAN to the new System and test the link step by step as well as continuous run mode upto 24 hours to observe the data acquisition/exchange process. During the continuous run mode, the data collected shall be stored in a temporary files /tables for review to assess effectiveness and stability of integration. All relevant logs for monitoring the communication with Control Centre under test such as defined for regular UNMS system shall be stored and presented and reported on similar displays. The Hardware required for necessary connectivity including the interface with communication links shall be included as part of Development System Hardware.

This system shall also be used as Training Simulator; the major feature shall include: A communication network model that simulates the Communication System in a realistic manner including its response to simulated events, Instructor actions and Trainee actions. The Communication network model response shall be identical to the response observed by the operator in the actual computer system. The User interface shall also be identical to that of production system in order to provide a realistic and immersive training simulation. Instructor control feature that include the ability to setup, control, participate in, and review the results of a training session. An ability to obtain data from UNMS system automatically for Training Simulator initialization shall be there. This initialization shall include real time snapshots, network status/ topology Save cases etc. The computer systems setup shall be such that the training for operators can be conducted without disturbing any other Control Centers real time or other critical operations. An ability to establish the following training conditions as a minimum:

1. Normal Network State
2. Configuring & provisioning of Bandwidth for end to end.
3. System disturbances
4. Contingency analysis
5. Redundancy Adequacy
6. Loss of major backbone of communication

2.8.Virtualization

Virtualization is not mandatory. Bidder can offer a Solution Architecture that meets the end objectives with or without virtualization, as applicable, as mentioned hereunder:

- a) Solution should include hypervisor with functionality of High Availability, Fault Tolerance, hot Add (CPU, Memory, Storage & Network), dynamic power management, storage and network IO control (VM level encryption).
- b) Solution should include the ability to add CPU and memory to virtual machines dynamically on the fly when needed, without disruption or downtime of working VMs for both windows and Linux based VMs.
- c) Solution should be able to identify, showcase, recommend and reclaim resources like powered-off VMs, idle VMs, orphaned objects etc. from the virtualized environment.
- d) Solution should show dashboards and generate or schedule reports (in standard format) on capacity utilization, performance management and standard compliances.
- e) Solution should be able to run scenarios to determine whether future workloads or expansions can be accommodated on the running virtualized environment.
- f) Solution should have an operations console that provides an easy way to perform monitoring and logging of the virtualized environment in order to quickly identify the root cause and troubleshoot issues.
- g) Solution should have the capability to provision and migrate the workloads to more than one public cloud without any re-architecture of the application/system.

-----End of the Section-----

PART- B SECTION-3

USER INTERFACE REQUIREMENTS

PART- B SECTION-3

USER INTERFACE REQUIREMENTS

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PART- B SECTION-3

USER INTERFACE REQUIREMENTS

3.0 General Requirements

This chapter describes the User Interface requirements for the UNMS system. It is Employer's/Owner intent that all functions of UNMS System shall have common user interface. All user interactions shall be from full-graphics display.

The user interface requirements, specified in this section, are applicable for the user interface application of the complete UNMS system. All of the features and functions shall be available to any user, except for certain functions for which access is restricted according to system requirements. All reports/displays mentioned herein shall have the capability to generate pdf, word, xls format reports in addition to the displays as depicted typically in this section. Complete MS office suite with all features shall be compatible for all displays and report generation with find, search, copy, paste, sort, filter, exports etc. features.

3.1 System Users

The term "user" is applied to the personnel identified and responsible for working on UNMS system and applications. User and personnel based logins shall be provided and logs shall be created corresponding to changes made by that user. These users shall be required to login in one or more of following **user modes**, which include:

(i) Admin	Administrator will have both editing and viewing rights. Admin will be able to view and edit the network. He should be able to commission new links and modify any existing link. He should be able to generate reports.
(ii) Operator	Operator is responsible for various operation in the network like fault rectification, report generation etc. But he should not be able to add/Remove Node , Links in the network
(iii) Maintenance	Maintenance rights are mainly for maintenance purpose like fault rectification. He should be able to view the Particular node/ Link But will not have rights to modify the node/Link. The maintenance rights should expire after completion if maintenance activity.
(iv) Guest	Guest should be able to just view the network. He should not be able Edit/ Modify any Node/ Link. Guest Right should be assigned just for particular defined period and should expire after expiry of that period.
(v) System(NMS) Owners	System Owner will be Regional/State/Utility. The system will be able to view and Manage network of their area. This area will be the area which that particular state/region/Utility is handling. They will be able to create, delete and modify links.

The Employer/Owner shall be able to assign the operation of certain functions, or features of functions, to specific user modes. Each individual user shall be assignable to any one or more user modes. It shall be possible to assign user workstations to modes of operation. The functions permitted for each mode shall be defined in a table. Any other type of user shall be decided during detail engineering.

User access to all functions of system shall follow a consistent set of common user access guidelines. A single sign on mechanism for defining and controlling user access to the system shall be provided. An Identity management application shall be deployed to manage and to help achieve seamless access to all applications for authenticated users.

Password security shall be provided for access to the system, its operating system, its layered products, and other applications. Each password shall be validated against the corresponding user information in the database. Individual user shall be provided with a single set of username & password, for secured login to access all applications. Users shall have the ability to change their own passwords.

3.2 Identity Manager

An Identity management application shall be deployed to manage and to help achieve seamless access to all applications for authenticated users. Identity management system shall have following capabilities: -

- The Administrator/Owner shall be able to assign the operation of certain functions, regions/Area of responsibility or features of functions, to specific user modes/groups.
- The functions permitted for each mode shall be displayed.
- User access to all functions of system shall follow a consistent set of common user access guidelines.
- A single sign on mechanism for defining and controlling user access to the system shall be provided.
- Password security shall be provided for access to the system, its operating system, its layered products, and other applications.
- Each password shall be validated against the corresponding user information in the database/directory.
- Individual user shall be provided with a single set of username & password, for secured login to access all applications.
- Users shall have the ability to change their own passwords.
- Identity Manager shall manage to automatically Load and Reconcile Account Data.
- Manager to identify and eliminate orphan, dormant and ghost accounts automatically.
- Able to maintain records of changes related to access rights.
- Able to maintain summary of separation of users those who are transferred, retired or leave the organization.

3.3 Function and Data Access Security

After a user has successfully logged on, access to the functions, displays, reports, and database elements shall be restricted by pre-assigned operating jurisdictions. These operating area assignments shall be made when the function, display, report, or database element is defined.

The access security function shall compare the user's assigned operating jurisdiction against the operating jurisdictions assigned to the function, display, report, or database element each time a user attempts a console action, such as:

- (a) Calling a display
- (b) Entering or changing display data
- (c) Viewing, editing, or printing a report
- (d) Web browsing from each operator console.

Each user login and logout attempt- success or failure shall be logged in an activity log maintained on the system and also recorded as an event and posted to the event log. An alarm shall be defined after a configurable number of unsuccessful attempts to login. Each user action shall be recorded in event log and identified by username. A feature shall be available to automatically log off the user of a workstation after a predefined period of inactivity to safeguard against users who may leave workstation unattended.

3.4 User Interface (UI) Environment

A common User Interface shall be provided across applications. It shall provide a common look and feel across all system functions and environments (excluding Historian Systems) including the real time system, backup system.

The same user interface and displays used for real-time shall be used for study mode. A different background colour or similar mechanism shall distinguish between these modes.

It shall be possible to save user specific choice and display configuration and same shall be made available to user whenever and whenever he logs in. UI shall allow each user to configure and save a preferred layout, size, and location of items and elements in windows and displays. The google earth display Features shall provide full-graphic displays that a user shall be capable of panning and zooming on google earth. The google earth display features such as Layers, De-clutter levels (on the basis of bandwidth, Link, Channel, vendor wise or as specified/required by Employer/Owner), Overlays shall be supported.

3.4.1 Dynamic Dashboards

Dashboard shall visually track, analyze and display Key Performance Indicators (KPIs), metrics and key data points to monitor the health of the network, availability of links/channels/services, bandwidth & network usage etc. This shall consolidate and arrange numbers, metrics and sometimes performance scorecards on a single screen. This shall be customizable for a specific role and display metrics targeted for a single point of view as per requirement of

Employer/Owner. The dashboard shall include a customizable interface and the ability to pull real-time data from multiple sources.

A feature to create dynamic dashboards, simply by selecting, dragging and dropping the points on a dashboard template shall be provided. The dashboard shall have displays like Bar chart, pie chart, line graph etc.

The display shall also indicate the limits of the values. Dashboards shall be definable by the end user without requiring the involvement of an administrator or programmer. The details of displays in dashboard shall be submitted for approval during detail engineering.

3.5 Display interactions

Rapid, convenient, and reliable display requests shall be provided using the following methods. It shall be possible to select display from/ by:

- (a) A menu display
- (b) Cursor target selection on other displays
- (c) Selection of an alarm or event message.
- (d) Entering a display name or number.
- (e) Re-call command for previous display.
- (e) Selecting a point of interest (substation) from an Overview display.
- (f) It should be possible to reach to any display of the system with maximum 3 nos. of clicks.
- (g) Right click menu option on any display link to enable the user to open the display in a new window or active window. Tagging on real-time display should be possible with facilities such as Call-Out on placing cursor on it.

3.5.1 Display navigation

Display navigation methods shall provide a consistent approach for moving within a displays. The use of appropriate methods for Panning with cursor positioning device as well as from scroll bars, Zooming with cursor positioning device, Navigation window for rapid movement on a world display and Rubber-band zooming shall be supported.

3.5.2 Display Note pad

A User shall be able to place and edit a note on any display. A symbol shall appear on the display indicating the presence of Note on that display. The content of the note shall be callable using a cursor target. The contents of these pages shall be editable and accessible by any console. The user shall have the ability to clear any page of this display and to type over previous messages. Notes Summary should be available with username who has entered the NOTE.

3.6 User Interaction Techniques

The user's interaction with the U-NMS system shall primarily be accomplished using a menu item selection technique. The first step in the interaction will be selection of the item to be operated upon. The user shall then be provided a menu of operations applicable to the selected item.

As appropriate for the data and function requested, a menu containing output destinations such as screen, printer, or file shall be presented. When the destination is selected by the user, the requested action shall begin.

The user shall be able to end the interaction sequence at any time by selecting a cancel command. A programmer-adjustable time-out cancel shall also be provided.

3.6.1 User Guidance

The U-NMS system shall respond to all user input actions indicating whether the action was accepted, was not accepted, or is pending. For multi-step procedures, the systems shall provide feedback at each step. User guidance messages shall be English text and shall not require the use of a reference document for interpretation. Only Employer/Owner approved mnemonics can be used.

3.6.2 Function Key Usage

In order to alleviate the operator from the repetitive task, such as calling a particular function, use of virtual keys on the monitor and function keys on the standard keyboard shall be provided. User should be able to define key functions as per their requirements.

3.6.3 Trending

Trending is a display of series of values and average values of parameters on a time axis. Both graphical trend and tabular trends shall be supported by the system. The attributes of the trend display shall be user configurable. The user shall be able to select real-time or historical data for trending on graphical displays and on tabular displays. Further it shall be possible to trend real-time and historical data on the same graphical and tabular trend displays (For Eg. User Shall be Able to View the trend of Availability of channel/Link/Service/as required between point/nodes on the UNMS System). It should be possible to trend different types of parameters (bandwidth, service, availability, link delay, Regional Performance etc.) with associated Scales on the same display. Trending of parameters on the same display shall be supported. The user shall be able to select a trend rate different than the sampling rate separately for each trended parameter. Major and minor interval of x & y axis should be user-configurable for any data or time. There shall not be any limitation of trends associated with a single display.

Objects like small window showing trend curve or any table in a selected display should be possible. Tabular & trend presentation of the recent history (user configurable sample time and duration) of any data should be available on operator console.

All points, System parameters such as communication and application parameters shall be made available for trending, by default. Once the Node/Link/channel/service is selected for trending, it

shall display default period should be user specified, both in graphical and tabular form. At least Three month data should be readily available in the Trend database to provide instant view to the operator based on the selected time period.

3.7 Inventory Detail

Inventory consists of all the equipment, cards, Ports, DCPS, SFPs, Cabinet, Routers, NMS, GPRS, VSAT Servers, Power supply units, etc. installed in the system. Inventory also consists of Spares available with the User of Region/State.

U-NMS System should contain detail of the entire Inventory installed in the system including spares. The detail should consist at least, but not limited to, following detail

- a) Serial Number of the component
- b) Part Number of the component
- c) Region/ Area/ Node where the Component is present
- d) Which user has made entry of the component in the U-NMS System
- e) Time for which the component has been installed in the system
- f) Any other data which is required by the user
- g) Date of procurement/Date of commissioning.

User should be able to search any component, either installed or in spare, through U-NMS System. User should also be able to make manual entry of the spare in the system for the spares. If some component is transferred from one region/site/state to other, or from one node to other, there should be provision for manual transfer in case of spares and automatic transfer in case of Installed inventory.

3.8 Alarms

Alarms are conditions that require user attention. All alarms shall be presented to the user in a consistent manner. Alarm conditions shall include, but not be limited to, the following:

- (a) U-NMS application program generated alarms
- (b) Communication link/Service failures.
- (c) U-NMS system hardware or software failures.
- (d) User Configurable logics.

Each alarm shall be subjected to a series of alarm processing functions. Alarm conditions shall be assigned to one or multiple alarm category and alarm priority levels. Alarms shall also be subjected to advanced alarm processing. The results of the alarm processing shall determine the console(s) that will receive and be authorized to respond to the alarm and the associated actions with the alarm.

All alarm messages shall be recorded and archived in chronological order. It shall be possible to sort, display and print user selected alarm messages from any console by the user.

3.8.1 Alarm Categories

An alarm category provides the logical interface that connects an alarm condition to a specific Area of Responsibility (AOR) as defined and accordingly alarm shall be reported to user. Every alarm shall be assignable to a category. Each category shall, in turn, be assignable to one or more consoles. A means shall be provided for changing operating shifts without reassignment of alarm categories at a console. Console failure shall result in automatic reassignment of alarms to other consoles in a pre-defined manner and shall generate an alarm. Each log-on and log-off shall be reported as an event.

3.8.2 Alarm Priority levels

Each alarm shall be assigned to an alarm priority level. Up to 8 alarm priority levels shall be supported. Each alarm priority level shall be presented in separate display. Provision for element wise alarm for on-line Database editing shall be there. For each alarm, it shall be possible for the programmer to independently configure the following actions:

- (a) Audible alarm tone type selection and its enabling/disabling. The silencing of audible alarms shall be recorded as event.
- (b) Alarm messages to be displayed on an alarm summary
- (c) Alarm message deleted from alarm summary when acknowledged
- (d) Alarm message deleted from alarm summary when return-to-normal alarm occurs
- (e) Alarm message deleted from alarm summary when return-to-normal alarm is acknowledged
- (f) Alarm message deleted by user action.

Every Alarm shall be accompanied by an Audible tone which shall be user configurable also in real time for some particular events also, like:

- Loss of Signal/Remote Defect indication.
- Loss of Frame.
- Auxiliary supply system Alarm (Low battery, High Temp. Etc. Any other alarm as specified by User)

A dedicated display shall be provided for selection of Audible Tone in separate category of Alarms. The automatic generation and sending of an E-mail and SMS containing operator selected Alarm or user-defined data shall also be possible.

This assignment shall determine how the alarm will be presented, acknowledged, deleted, and recorded. All acknowledged Alarms shall be reported as an event along with the identification of user and/or the workstation.

3.8.3 Advanced Alarm Management

Standard products for advanced alarm management shall be provided. Desirable features of the alarm management function, as available in the standard product shall be supplied which may include:

- (a) Minimization of nuisance alarm messages (e.g., repetitive alarms for the same alarm condition)
- (b) Highlighting of the most urgent messages
- (c) Display of Alarms Vendor wise/Link wise/Channel Wise/ As desires by user.
- (d) Sort, filter of alarms by users by node, element, type, date & time.
- (e) Intelligent Alarm processing (Alarm based on logic of alarms) - to assist operator in quickly finding the root cause of disturbance.

3.8.4 User Interaction for Alarms

The User shall be able to perform the alarm interactions described below

- Alarm Inhibit/Enable
- Alarm Acknowledgment
- Change Alarm Limits
- Annotate an alarm by adding a comment
- Attach a note or document to an alarm
- Copy / Paste and export Alarms into an Spreadsheet and all MS-Office formats for offline analysis

3.8.4.1 Alarm Analytics and Intelligence

U-NMS System should be able to build intelligence out of various alarms that are coming in the system. The intelligence should be built in due course of time through various events in the Network and the intelligence build shall be revised after every 3 months on a periodic basis to finetune the prediction behaviour. The main purpose of the intelligence should be Alarm reduction and quick fault detection and restoration.

3.8.4.2 Alarm Presentation

Alarm presentation shall be determined by the alarm's category and priority. Displays shall highlight every alarm condition using a combination of colour, intensity, inverse video, and blinking. The alarm condition highlighting shall show whether the alarm has been acknowledged. The highlighted alarm condition shall appear on all displays containing that device or value at all consoles regardless of the alarm's category.

Alarm messages shall be a single line of text describing the alarm that has occurred and the time of occurrence. The alarm message shall not require the use of a reference document for interpretation.

The user shall be able to change the alarm limits, inhibit/ enable alarms and acknowledge alarms. All actions (except acknowledgments) shall be logged as events.

3.8.4.3 Alarm Window

Each screen shall include a scalable window containing symbols for nodes, vendors, equipment type (STM 1/STM 4/STM16 etc). These symbols shall blink when an alarm condition is detected for a device or value associated with the symbol. Blinking shall cease and the symbol shall be highlighted when all alarms associated with the symbol are acknowledged. The symbol shall return to its normal presentation when the last alarm associated with the symbol is deleted. Cursor selection of the symbol in alarm shall result in the presentation of a display associated with the symbol.

A special alarm window shall be provided, in which the most recent alarm messages shall be displayed. All summary alarm views shall support ad-hoc sorting. Clicking on a column header in the alarm view (time, station, priority, etc.) shall sort the alarms by that column.

All summary alarm views shall support ad-hoc filtering in which a user can specify filtering criteria in order to easily locate specific types of alarms. Examples include, but are not limited to:

- a) Specific Time/Date ranges
- b) Alarms exceeding a particular severity
- c) Alarm messages containing particular device names
- d) Alarm messages containing user annotations
- e) Filtering on basis of device type, line name, etc.

It shall be possible to save any number of filtered alarm views for easy retrieval in the future.

3.9 Events

Events are conditions or actions that shall be recorded by the UNMS system but do not require user action. Events shall be generated under the following conditions (but not limited to)

- a) User initiated actions
- b) Conditions detected by application functions that do not require immediate user notification, but should be recorded.

Events shall be recorded in the form of an event message. The event message format shall be similar to the alarm message format. Event messages shall be displayed on an events summary.

Event messages shall be archived in chronological order. It shall be possible to sort, display, filter and print event messages from any console.

3.10 Hardcopy Printout

The UNMS system shall have features to produce a print out of a display, trends, alarms, events etc. from a menu. It shall be able to generate reports in the Format given in relevant Appendix. It shall be possible to take print with various options e.g. Print the viewport, Print the complete display adjusting to a specified page size, Print a selected portion of a display or screen.

The displays shall be printed with white background by default. The borders of the viewport, rulers, file tab shall not be visible in the printout of any display unless specifically chosen. Multiple page displays shall have page numbers like Page X of Y. Also, the options for printing shall include at least choice for orientation, background colour, page size, inverse colour option, colour/ black & white and print preview.

All hardcopy printout shall include the following additional default information apart from the display print out:

- a) Date and time of the print out
- b) Name of the user who has given the print out command
- c) Identification of the console from where print out was generated
- d) Name/ Identification of the display

Snapshot of any display full and part thereof if required should be printable in a fit to page format.

Sample report format has been shown in Appendix-I. These formats are for reference final formats and additional reports shall be finalized during detail engineering.

3.11 Dynamic Data Presentation

It shall be possible to present any item in the database on any display. All data control capabilities shall be supported from any window of a world display. Device status or data values shall be displayable anywhere on the screen, excluding dedicated screen areas such as the display heading.

All fonts supported by the operating system delivered shall be supported by UNMS system. Standard X-Window system fonts shall be provided with the UNMS System. **Hindi fonts as well as all Indian local language fonts (true type fonts) shall also be supported.** All fonts shall be supported on the user interface devices and all printers supplied with the system. The types of fonts to be used in a particular display shall be selected at display definition time. There shall not be any limitation on the colour and size used for the fonts.

Status and data values shall be presented in the following formats as appropriate (but not limited to):

- (a) Numerical text that presents link bandwidth
- (b) Symbols, (Coloured or as required) representing the status of link and any alarm in that link.

3.12 Web based Trouble Ticketing System

U-NMS System should have a Web based Trouble Ticket system. Every customer should be able to lodge a complaint, whenever a link/Channel is down. The complaint shall be raised by either

customer himself or by calling to helpdesk. After raising of trouble ticket, customer should be able to track the status of trouble ticket from web browser.

There should be dedicated Android/iOS-based app of the tracking of trouble ticket. The customer should be able to raise the trouble ticket from the app itself. The App should be available in App store of Android and iOS for download. There should be a dedicated login for each customer from which he can raise ticket and track its status. The customer should get Push Notification from the app for the status of the trouble ticket. The customer should also get SMS and email notification for the status of trouble ticket.

Trouble ticket should get closed after getting confirmation from the customer/Owner/Employer.

3.13 Element Highlighting

Element highlighting techniques shall be provided to draw the attention of Dispatcher to critical state of the system. The highlighting technique such as, change of colour, size, colour intensity, blinking, Character inversion, Line texture, appended symbols etc shall be supported. This feature shall be used to highlight alarms, locations on a display and error conditions.

3.14 Display Types

The following list describes the type of displays which are to be included (but not limited to them) in the proposed UNMS system. All Displays shall be having default setting for showing Date & Time. The types of displays are not exhaustive. New types of displays can be added during detail engineering and when required. The display list shall be final after submitted for approval by the contractor.

3.14.1 U-NMS System Display

A display shall be provided that lists all U-NMS system directory displays. The displays shall be listed in alphabetical order with suitable separation in the list to enhance readability. Each entry in the list shall have a cursor target for display selection. A search facility / filtering should be provided. The displays shall have layered architecture with full control of individual layer, 3D movement. Display features such as Auto-fit to Screen shall be provided. Mash-up interface with google earth shall also be provided.

Feature to “find/search” Node/IP in the geographical display shall be possible. In case of any pre-defined event the Geographical visualization shall automatically focus on that point grabbing operator attention.

3.14.2 Network Availability Display (Channel/Service/Node of region/state etc.)

A Graphic/tabular overview of Network availability showing availability between nodes/Channel/Link/as required should be displayed. The Graphic/tabular overview should show the vendors wise/Link wise/Channel wise/Bandwidth wise availability. Graphic/tabular overview should be able to display availability between any Nodes on the network. For eg. If user wants to see the availability of nodes in the region for STM-16 nodes, Network availability display should be able to provide it. If user wants to see the channel/Service Availability of Region, Network availability Display should Display the Availability of Channel/Service of the

region/state/province in the format required by the User. The report shall be generated in word, pdf, xls format.

3.14.3 Network Display

The Network display shall be provided as a schematic diagram showing network vendors wise/Link wise/Channel wise/Bandwidth wise/ As required by user. All SDH/PDH/GPRS/any future Network Node should be displayed on the display. User should be able to view the Network by applying various filter for eg. If user want to view STM16 network of a region or whole network, display should provide for necessary arrangements/provisions for the task.

3.14.4 Alarm Summary Displays

Display that list or summarize all unacknowledged and acknowledged alarms shall be provided. The summary shall separate acknowledged and unacknowledged alarms. Capacity shall be provided for alarm messages for each alarm summary type. If an alarm summary display becomes full, the oldest messages shall be automatically deleted and the newest messages shall be added. It shall be possible to perform any alarm interaction from this display. Sorting and filtering of alarms on the basis of area, station, device type, etc. or any of the combinations of these shall be provided. When a fault is cleared, the display should have a provision to show the fault restoration time and its trend with previous restoration time. Alarm display should have provision for display based on severity, alarm type, alarm frequency and alarm trending.

3.14.5 Event Summary Displays

Event Summary displays shall list the most recent events and shall be organized by category for those categories assigned to a given console, as one summary display for all categories assigned to a console, or by all conditions system-wide without reference to the categories assigned to a console, as selected by the user. The user shall be able to select between viewing events in chronological or reverse chronological order.

3.14.6 Inventory Display

Inventory Display should provide a holistic view of the whole inventory of the Network. It should display various equipment, cards, SFPs, Servers, Routers etc. present/installed in the system. The display should also provide the inventory of spares present with various Region/users. Various users should be able to enter the spare detail of their concerned region/area manually. The display should provide the Serial Number, Part number, manufacturer, Node where it is installed and any other data required by user. The user should be able to Search any component in the inventory by serial number/part number etc. User should also be able to filter the inventory as required by him. For eg., if user want to see, STM-16 cards installed in region/State, the display should have provision to provide it.

3.14.7 Local Network display

The local network display should be able to provide the physical and logical topology of the UNMS System center/ local area where U-MNS system is installed. It should provide a holistic

view of the interconnection of servers, routers, clients and various network elements installed in UNMS System Center/ local area. The displays should provide link status between network elements. If the physical connection between network elements is down, it should be highlighted in the display. For eg. Suppose a route is connected to server through on LAN through RJ45 cable. If the cable or the connector got damaged and the link between them got disturbed, then it should be highlighted in RED colour in the display.

3.14.8 Trouble Ticket Display

Trouble ticketing display should provide the status of various trouble tickets in the network. It should provide the acknowledgement status, person/user assigned for rectification of fault, estimated turnaround time, status, Traffic affected, Links/Channel affected due to fault and any other information required by user. The display should have provision for providing detail of cause of the fault, rectification method and steps taken to avoid such fault for the closed tickets.

3.14.9 Computer system Configuration and Monitoring Displays

Graphic and tabular displays shall be provided that allow the user to:

- (a) Monitor and revise the configuration of the computer system supplied under the Package.
- (b) Monitor the system's resource utilization statistics

3.14.10 Communication Network display

This display shall show information of communication display of the status of the communication links being used for data exchange with Control centres. The display shall also indicate the healthiness of standby communication links. Failure of main or standby communication links shall be suitably alarmed.

3.14.11 Channel Displays

The display should provide Channel based view between the entire UNMS System (or any Node). Any communication link failure between two Node should be highlighted on priority basis. The display should be providing in graphical and tabular manner. There should be option to filter the display of DCN channel

3.14.12 Help Displays

Help displays shall be provided to aid the user in interpreting displayed information and to guide the user through a data entry or control procedure. Help displays shall be provided for each display that is provided with the system. Each display shall have a prominent cursor target that the user can select to request the associated help display. For standard displays, software aids (such as context sensitivity) shall be used to present pertinent help information in an expeditious manner. A programmer shall be allowed to modify and create help displays.

3.14.13 Historian Data display

Historian display shall be different from other displays and shall have user friendly features such as tabs or icons for events, major disturbances, outages etc. for quick report generation for a defined time period. Recently and frequently used fields for report generation and configuration shall be stored as “favourite” reports. The display shall have drop down menus for:

- Data Elements (Network availability showing availability between nodes/Channel/Link/as required should be displayed.) and calendar view for selection of Year, Month, week, date and time.

On the display, Provision for selection of format shall be made available (option for word, Excel, PDF) with Export button. On the top of the display types of reports should be displayed, e.g. daily report, Monthly Report etc.

3.14.14 Virtual machine Display

If contractor is providing virtualization, the display with following feature should be provided.

- The ability to add CPU and memory to virtual machines dynamically on the fly when needed, without disruption or downtime of working VMs for both windows and Linux based VMs.
- The ability Able to identify, showcase, recommend and reclaim resources like powered-off VMs, idle VMs, orphaned objects etc. from the virtualized environment.
- Show dashboard and generate or schedule reports on capacity utilization, performance management and standard compliances of the deployed resources.
- Should be able to run scenarios to determine whether future workloads or expansions can be accommodated on the running virtualized environment.

3.14.15 Delay Measurement display

The Display shall measure between two nodes. The system shall measure delay and bit error measurement for fiber optic link configured across multiple vendor networks. For Ethernet, there shall be provision for demonstration of latency, throughput, packet loss, ping test etc. across multiple vendors.

3.14.16 Prediction Display

Prediction display should be generated from the analytics build in the system. Based on the analytics built by the system, it should display the intelligence it has built and the predictions that the system make on the display. The display should also show the predictive report it has built for validation. User should be able to make any changes in the prediction/intelligence built by the system and the system should act and take into consideration, for future analytics, the changes made by the user in the prediction.

3.14.17 Service Display (Ethernet, E1, VLAN etc)

The display should show all the services that are running on an optical link at a Node and between nodes. It should display whether a service is up or down. It should display the downtime of the service and should display a trend of the downtime and availability of the display.

3.14.18 Resource Utilization Display

The display should show the amount of hardware resources being utilized by the UNMS system. It should display the Up time, idle time, CPU utilization, RAM utilization, Hard disk utilization, etc. and the resources that are available with the system. If any system/resource is being over utilized or underutilized, system should give a notification regarding this over and underutilization.

3.14.19 Bandwidth availability

Band width availability display show display the bandwidth available at a node and between two nodes. It should display the available bandwidth in the network. The available and used bandwidth between each node should be displayed on the link shown on the network diagram. And congestion/bandwidth choking should be highlighted on the display and a notification should be displayed for the congestion/bandwidth choking. User should be able to see bandwidth wise availability for eg, User want to see that All STM-4 links and how much bandwidth is available in that link, the display should be able to view it. This Filtering of Bandwidth should be applicable to all Optical, Electrical etc. links.

3.14.20 Geographical Display

Geographical display should display the entire network of the region/State on Maps like google maps. Each station/node should be placed at its exact location on the map. If we double click on the node on the map, that node should get open, i.e. user should be able to login in the equipment installed at that location. All the communication equipment installed at a particular node should be visible and accessible from the display. All the logical links connected the nodes should be highlighted on the map. User should be able to zoom in and zoom out of the display. Inter-state, Intra-state, Local, cross-border and inter-regional links should be displayed on geographical map. Any alarm on the node should be displayed with the colour assigned to its severity on the geographical map and logical link connecting the node..

3.14.21 Statewise Display

Statewise Display should represent the Network of all the states in the region. The Respective State Utility should have authorization of managing the network of that state only. All the nodes connected in the region should be geographically visible in the display. All the stations connected should have the logical link between them. Nodes having equipment of different make should have different colour/structure. If a link between the nodes goes down, that Node and link and node should highlight with red colour or the colour showing the severity of the Alarm. They should be able to calculate availability, Performance etc. of that state for which they have authorization.

3.14.22 Outage Display

The outage Display should highlight the various outages that has happened in the network and the outages that are scheduled in the future. It should display various outages that has occurred in the network and should differentiate between planned and unplanned outages. There should be provision to add any future planned outage is being scheduled. That Planned outage/maintenance should have to be approved by the respective owner and after approval from respective owner, that scheduled outage/maintenance shall be take. At approval stage, start time, end time and total time required by for the planned outage/maintenance should be highlighted. After the scheduled outage/maintenance has been taken and planned maintenance work has been completed, a notification should be send to respective owner about the completion of the scheduled maintenance, actual start time, actual end time, total time and whether the maintenance has been completed in scheduled time or not. It should also generate a report showing detail about the outages that has occurred in the system, separately showing planned and unplanned outage. The report should also highlight the cases of planned outage/maintenance where total outage time is greater than approved time. Report for all future scheduled outages should also be generated.

3.14.23 Congestion Display

The Display should highlight congestion between two nodes and multiple nodes on the network. The display should highlight the available bandwidth and the used bandwidth between nodes. It should show if there is congestion in bandwidth occurring between nodes or multiple nodes. The display should be able to suggest upgradation in bandwidth is congestion is occurring in the bandwidth or on the verge of occurring. It should do so by giving notification and generation of report highlighting the available bandwidth, used bandwidth and any congestion that is occurring in the network.

3.14.24 Performance Monitoring Display

The Performance monitoring display should display performance of all the node/links/channels of the network. It should highlight any error or degradation in performance of any node/links/channels etc. It should also be able to generate a report of the performance of node/links/channels etc.

3.14.25 User Login Display

User login Display should display a login screen for various user to login into the system. Every user who login into the system, should have authorisation according to rights provided to him. The number of wrong password attempts should be displayed after a successful login for every user. There should be provision to reset the password of every user, in case the user forgot his/her password. After 5 unsuccessful attempts, user access should be locked, and admin should be contacted for resetting of the password.

3.14.26 Configuration management server Cum Centralized Management Console (CMC) Displays

Graphic and tabular displays shall be provided that allow the user to:

- (a) Monitor and revise the configuration of the computer system supplied under the project.
- (b) Monitor the system's resource utilization statistics

The display should highlight the overall network of the system with all the associated parts and applications.

3.14.27 Web Server Display

The web servers shall provide access to remote clients through commercially available Off-The-Shelf (COTS) Web browsers. If any software component is required for the remote client, the same shall be downloaded to the remote clients whenever clients connect for the first time.

3.15 Integration with Electronic Documents and report generation

Information related to system equipment often resides in standard format electronic documents (PDF, DOC, XLS, JPG, etc.). In order to minimise the time for users to locate this related information when needed, the user interface shall provide a mechanism for accessing electronic documents related to any device on a display. This shall be through right-click menu option or similar.

The functionality to send messages and files between UNMS workstation consoles and to and from workstation consoles between UNMS system centers (Main & Backup) shall be provided.

There should be option to print reports related to Displays mentioned above. Types and format of reports will be finalized after submitted for approval by the contractor. After type and format finalization, system should be able to generate report with automatically in the desired format (like doc, pdf, xls etc.).

Examples of Electronic Documents that should be available in this fashion include:

- (a) Digital Images
- (b) Equipment Manufacturer documentation (PDF or HTML)
- (c) Maintenance and other Historical Reports

-----End of the Section-----

PART- B SECTION-4

SYSTEM SOFTWARE REQUIREMENTS

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SYSTEM SOFTWARE REQUIREMENTS

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PART- B SECTION-4

SYSTEM SOFTWARE REQUIREMENTS

4.0 General Requirements

This section describes the characteristics of system software such as Operating system, and support software (compilers, database development and maintenance, display development, network services, Report generation, diagnostics, security and Backup utilities) provided by Contractor and the original equipment manufacturer (OEM) as necessary to support the applications of U-NMS system. Audit by Operating System OEM for system configuration after Installation & Commissioning shall be tied by the vendor for the proposed system. This section also describes the standards to be followed for all supplied software. All software supplied shall be of Enterprise edition. Bidder should submit Undertaking directly from OEM that current version of the software including updates, software patches released time to time will be supported for next 7 years excluding the contract implementation period.

4.1 Software Standards

All software of U-NMS system provided by the Contractor, including the Operating system, Database and support software, shall comply with the industry-accepted software standards. In areas where these organizations have not yet set standards, the software shall comply with those widely accepted de- facto standards put forth by industry consortiums,. The Contractor shall commit to meet the "open systems" objective promoted by industry standards groups.

The source codes /web-services based open APIs of the proposed U-NMS shall be provided to the Employer to allow integration with upper-layer or same layer management systems via WSDL or XML/SOAP/HTTPS etc.

4.1.1 Design and Coding Standards for U-NMS applications

All applications of U-NMS system shall be maintainable by Employer/Owner using the supplied software utilities and documentation. The software design and coding standards of U-NMS system shall address the followings:

- (a) **Expansion:** Software shall be dimensioned to accommodate the size of U-NMS system.
- (b) **Modularity:** Software shall be modular i.e. functionally partitioned into discrete, scalable, reusable modules consisting of isolated self-contained functional elements and designed for ease of change. The system shall make maximum use of common industry standards for interfaces.
- (c) **Portability & Interoperability:** The system shall be designed for hardware independence and operation in a network environment that facilitates interoperability and integration of third-party applications. U-NMS system should support multiple database systems including Oracle, Microsoft SQL Server, MySQL etc.

4.1.2 Operating System

The operating system of all the equipments of U-NMS system including network equipments shall be latest version. The operating system shall be hardened to provide robust security. In order to facilitate cyber security requirements including patch management, common operating system is preferable to be used by all server nodes within the U-NMS System.

4.2 Time and Calendar Feature

A GPS based time reference shall be used for synchronising the U-NMS system time periodically. The internal clocks of all Servers and workstation consoles shall be automatically synchronised within the accuracy of ± 100 milliseconds of synchronised GPS time on NTP protocol. The calendar shall be customizable for working hours, holidays, weekends etc.

4.3 Network Software

The network software includes software for network communication, network security and network services. The network software shall be provided for each type of network node connection supplied with the initial system and shall be licensed for the quantities and types of nodes defined for the system configuration. It should be able to generate reports for a defined period regarding availability of communication links.

Network Communication: The network communications software shall use a standard network protocol such as TCP/IP.

4.3.1 System Security

The Contractor shall propose and implement a Cyber Security Policy in association with the Employer/Owner to secure the system in line with Government guidelines CEA, CERT-In, NIST, NTRO, NCIIPC, any regulatory authority etc. The overall policy and implementation shall account for:

- Network partition and DMZ (demilitarized zone) through use of Firewall as required to maximize the security of U-NMS system while facilitating access for data and information to all stake holders.
- Implement trusted, un-trusted and DMZ with clear perimeter.
- Prevent users from reading or writing data or files, executing programs or performing operations without appropriate privileges.
- Document all user sign on Auditing during FAT, SAT and during AMC period.
- Record network traffic for detecting unauthorised activity, unusual activity and attempts to defeat system security (U-NMS system designer to propose and document what constitutes normal activity/traffic).
- A user authentication scheme consisting at least of a user identification and password shall be required for the user to request a connection to any network node.

- All unused ports (physical and logical) of all routers and switches shall be disabled .
- All unused services shall be disabled on request.
- In routers, only the specified/required IP addresses should be OPEN.
- UNMS System should be secured from all interfaces e.g. underlying NMS/EMS, Nodes, Web users and any other interfaces and attacker/suspicious messages and should keep a log of all the communications.
- Auditing by CERT-In certified third-party during FAT, SAT and annually during AMC period. Each auditor along with the auditing firm need to be mandatorily changed after 3 consecutive audits so that different auditors audit the system throughout the maintenance phase including extension if any. Contractor shall implement the recommendation/remedial actions suggested by the auditor after audit for any upgrade (Patches) in existing system. Auditing shall be carried out at minimum as per base line cyber security audit requirements specified by National Security council Secretariat.
- Mechanism to detect unauthorized/unusual activity and attempts to compromise system security based on logs NMS and Application logs. The contractor to propose and document what constitutes normal activity/traffic periodically.
- All the devices that are connected to the system through LAN shall have mac-based binding.
- Third party software shall only be installed where required in consultation with employer/owner and after approval of competent authority.
- All unused default operating system users shall be disabled.
- Host-based firewalls shall be configured to only allow connections from specified nodes.
- Applications white-listing approach shall be deployed in hosts to allow only whitelisted applications.
- All unused services shall be disabled by default. There shall be a provision to turn on all services on request.
- In routers & switches, only the specified/required IP addresses should be OPEN.
- Protection requirement shall also include but not limited to the following:
 - APTs and targeted attacks
 - Zero-day malware and document exploits
 - Web threats (exploits, drive-by-downloads)
 - Bots, Trojans, Worms
 - Key Loggers and Crime ware
 - Disruptive applications
 - Data exfiltration
 - Denial of service attacks
 - Protection against various threat to virtual and physical servers
 - Protection against ransomware
 - Any other attacks/virus/Trojans/threats/malware/vulnerabilities etc.

4.3.2 Network services

The following network services shall be provided for the users of U-NMS system within the LAN if not in conflict with security requirements:

- (a) Network file management and transfer of files containing text, data, and graphics information
- (b) Network printing management
- (c) Network time synchronization
- (d) Backup over LAN (Storage Area Network)
- (e) Remote terminal session

4.4 Software Utilities

Some of the software utilities, which are required to be delivered along with the U-NMS system, are described here. However, Contractor shall supply all software utilities used to develop and maintain U-NMS software, whether or not specifically described by this Specification.

The software utilities shall operate on-line (in background mode) without jeopardizing other U-NMS application functions those are running concurrently. Utility software shall be accessible from workstations, processor terminals and servers.

4.4.1 USB port controller utility

The utility shall enable control on USB ports for disabling unauthorised usages.

Its functional specifications shall be as follows:

- It shall block USB devices based on device identity, port identity, device type (eg. allowing all keyboards, etc.)
- A provision for listing acceptable devices (white listing) shall also be provided.
- It shall log all USB port access events.

A dedicated system shall be identified for exchanging data with UNMS system in a secure manner after scanning the file to be transferred.

4.4.2 Image Backup and Restoration Utility

An image backup of the as built system of each of the Servers and workstations shall be provided on a user-selected archival device such as magnetic tape or SAN on Network, which shall be used to restore the system. Automatic full or incremental back up capability of selected systems at user defined intervals shall be provided. It should be possible to restore or recover any software/system at a selected time form backup. Last three image back-ups to be maintained.

4.4.3 Document Management System

- Web based “Document Management System” (DMS) software shall be supplied and installed at the owner’s facility by the contractor along with minimum 100 number of client access licenses and minimum 50 concurrent users.
- The DMS should be complete system to be used for management of documents including group editing, versioning etc.
- It shall have complete capability of tracking the documents version, ownership and editing.
- It should have web-based user interface (accessible from any client through browser) hosted on a server with backend independent database.
- DMS should store and make available all documentation of the project.
- It should have the facility for version control, access control, archiving etc. All access to the document should be based on the privileges assigned to the user.
- DMS shall have multiuser capability with user role and privileged management. Complete user management system along with predefined roles should be in built in the DMS.
- DMS is to be used as central document repository for the entire lifecycle of the project for easy managing and referencing of the project documentation.
- The Document Management System shall have a facility to integrate the Owner’s made documentation for system Operation to be used by Operator.

4.4.4 Data Exchange Utilities

Facility of data export and import from and to U-NMS system to external system shall be provided as detailed below: -

- **Through OPC Server:** A full OPC server compliant to the latest standard shall be provided in order to export real time data, alarms, historical data etc. to the external system. OPC clients for WINDOWS and Linux shall also be supplied.
- **Through ODBC:** Capability of export of U-NMS data to external system through ODBC shall be provided. All system parameters in the real-time database including real time data, calculated data, application configuration parameters and application output shall be available through the ODBC interface. Limitation if any or pre-requisite on PC for use of this interface, shall be clearly defined. It shall be possible to export data to export data through SQL queries to external system.
- **Injection of external values:** Suitable facility of injecting values from external system to U-NMS database should be provided. API along with utilities shall be supplied to facilitate this feature. It should be possible to use this API for developing the programs on Windows or Linux system using .NET or Java languages.

4.4.5 Other Utility Services

The U-NMS system shall include the following utility services:

- a) Loading and storage of information from labelled portable media storage units as dictated by the requirements of this Specification.
- b) The contractor shall provide utilities for preparing the .pdf output for the displays/reports available in the U-NMS system. It should also be possible to export all such reports to MS-Office format (like MS word, MS excel and PDF etc). MS office software and PDF software shall be provided in each of the workstations and remote consoles by the contractor.
- c) Reports for Web server - The Contractor shall provide utilities for preparing reports suitable for Web publishing.
- d) Antivirus Software - All computers and firewalls shall be provided with the latest antivirus software as on date of supply. The antivirus software shall have the capability of having its virus definitions updated from time to time. The Contractor shall be responsible for the maintenance & update of the antivirus software.
- e) Software Upgrade - The Contractor shall be responsible for the maintenance & update of the patches and signatures of Operating system, U-NMS system and Web System up to AMC period.

Automated patch management tools shall be provided to expedite the distributions of patches to the system. These tools should consider the possibility to use standardized configurations for IT resources.

4.5 Device Configuration of Network Equipments

The device configuration of all the network equipment shall be as per latest Cyber Security Guidelines of Government of India including CERT-In (<http://www.cert-in.org.in>) , DOT and Ministry of Power.

4.5.1 Firewall

As per the proposed network architecture, both the external and internal firewalls should be properly configured to segregate networks into different segments. The firewalls should have the following features including requirements mentioned in respective section of the technical specification

- Application awareness and control: Firewall shall have the feature of identifying applications in the network and enforcing security policy at the application level itself.
- Identity awareness: Firewall shall have the feature of integrating with applications like active directory and enable firewall rules to individual users or user groups.
- Firewall shall be able to receive threat intelligence feeds from time to time to detect threats and prevent attacks.

- Firewall device shall have the Geo-location based IPv4 & IPv6 database So that Geo-location-based traffic filtering shall be done in the device. The device shall regularly update their Geo-Location base IPv4 & IPv6 database from the Global repository.
- Firewall solution shall be purpose-built appliance and should not have wireless access and Bluetooth component within its hardware and software to facilitate direct connectivity (wirelessly) with firewall.
- Firewall solution shall provide IPv4 and IPv6 dual stack support from day one.
- The proposed Firewall / Firewall Operating System shall be tested and certified for EAL4+/ NDPP (Network Device Protection Profile)/NDcPP (Network Device Collaborative Protection Profile) or above under Common Criteria Program for security related functions or under Indian Common Criteria Certification Scheme (IC3S) by STQC, DEIT, Govt. of India.
- The following strategies shall be followed for secure configuration of firewalls as a minimum:
 - Cleanup rule.
 - Place a 'Deny Any-Any' rule at the end of the rule base.
 - Never create an 'Allow any-any' rule.
 - Allow rules should be created only for required services.
 - This will result in all traffic being disallowed, unless specifically allowed.
 - Lockdown/stealth rule.
 - All traffic destined for the firewall itself should be disallowed.
 - Anti-spoofing rule.
 - Place anti-spoofing rule as per RFC 1918 and 2827.
 - Enable DoS/DDoS features on Firewall.
 - Enable application level filtering of firewall.

4.5.2 Router

Necessary control should be applied on the router to stop unwanted traffic and attacks at the perimeter itself. In the secure configuration of a router, the following strategies should be considered as a minimum:

- Deploy proper access management and avoid remote administration.
- Enable secret password.
- Change default SNMP community string.
- ACLs (Access Control Lists) should include
 - Apply egress/ingress filter
 - Filter all RFC 1918, 3330 address space and special/reserved address

- Permit the required services for the required IP addresses only
 - Deny everything else.
 - Area segregation must be implemented (if OSPF is being used) between internal and external networks. Appropriate protocols must be enabled to prevent networks loops.
- Turn on logging to a central syslog server.

4.5.3 Intrusion Detection & Prevention System (IDPS)

The required features of the Host Based Intrusion Detection Systems (HIDS) and Network based Intrusion Prevention System (NIPS) are described below as a minimum:

A) Intrusion Detection and Prevention System (Host Based):

Host based Intrusion Detection and Prevention System module shall be provided for all machines on DMZ LANs. IDS shall be able to perform following actions:

- Capability for Detecting the intrusion attempt that may take place, intrusion in progress and the intrusion that has taken place.
- Flag and check unauthorized access
- Notify/Alarm/message of intrusion to:
 - Management console
 - Event log
 - Administrator by e-mail
- Create an audit trail for user and file access activity, including file accesses, changes to file permissions, attempts to install new executables and/or attempts to access privileged services
- In an event where user accounts are added, deleted, or modified, changes to key system files and executables is done in by unauthorized account or there is unauthorized attempt to overwrite vital system files, to install Trojan horses or backdoors suitable action should be taken such as:
 - Terminate User (intruder) Login
 - Disable User (intruder) Account
 - Forge a TCP FIN packet to force intruder connection to terminate
- Should provide events check for suspicious file transfers, denied login attempts, physical messages (like an Ethernet interface set to promiscuous mode) and system reboots.

B) Network based Intrusion Prevention System (NIPS):

The NIPS shall provide complete inline protection from network-based application layer threats by scanning packet payloads for malicious traffic. It shall detect, classify and stop malicious application, viruses, worms and spyware/adware etc.

After detecting an intrusion attempt NIPS should be able to perform following actions:

- Reconfigure the firewalls provided in this package.
- Send an SNMP Trap datagram to the management console.
- Send an event to the event log.
- Send e-mail to an administrator to notify of the attack.
- Save the attack information (timestamp, intruder IP address, victim IP address and port, protocol information).
- Force intruder connection to terminate.
- NIPS shall have capability to detect various operating system of devices/ servers running on the network and profile them for more visibility and protection. (for Impact assessment & Vulnerability analysis).

4.6 Cyber Security

The system shall be compliant to “Cyber security in power sector guidelines 2021” issued by CEA and its latest amendment. The contractor must ensure compliance with all the cyber security related statutory guidelines issued from time to time during the entire period of contract from all the regulatory bodies.

The UNMS system security features shall be designed to comply with the NCIIPC guideline for Critical Infrastructure Protection, ISO 27001, ISO 27019 and IS16335 standards as well as additional requirements specified herein.

The following guidelines/strategies shall be considered as a minimum by the Contractor for making the entire UNMS Centre immune to Cyber Attacks.

All the Hardware, OS and application software shall be hardened.

- Network Zoning shall be implemented as per the proposed architecture. No user shall be allowed to access remote network zones other than the adjacent zone.
- All log in/log out and cable plug in/plug out shall also be logged in Central Syslog server.
- Latest Cyber Security Guidelines of Government of India including **CERT-In** (<http://www.cert-in.org.in>) , **DOT and Ministry of Power** shall be followed.
- Cyber security Guidelines as per Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020 shall be followed.

- No user shall be allowed direct access from one network zone to another.
- All the Hardware, Operating Systems (OS) and application software shall be hardened. List of ports and services enabled in each hardware device must be shared after SAVT. This list must be updated periodically if any new ports/services are allowed or blocked after prior approval of Owner.
- All default user id & passwords shall be changed. All default user id & passwords shall be changed periodically in coordination with employer as per their policy. A well-defined password policy consisting of rules for forming passwords, sharing of passwords and password expiry etc. shall be finalized during detailed engineering. Default user settings shall enforce password complexity and usage rules.
- Logs of all network activities such as log in/log out; cable plug in/plug out etc. shall be created in the system.
- The contractor shall identify and list out the entire network devices, servers and protocols that communicate with physical systems and limit what is not required.
- A whitelisting policy shall be deployed for all port configuration, network routing, data flow, access etc. and all these details shall be documented and any changes shall be recorded and informed to the owner during entire period of contract.
- The contractor shall document the baseline configuration and shall be reviewed annually and will be audited by the auditor.
- Antivirus protection for clients shall be provided.
- Secure digital certificates shall be supported and configured to allow for single sign-on between Operating System and application system. This infrastructure shall allow customers to implement two-factor authentication into the respective application system.
- Centralized log collection shall be implemented which consolidates the logs from all the devices.
- Remote Desktop Protocol and Network File Share on SMB protocol between devices shall be disabled.
- Password Managers must be used to store passwords in encrypted format and use it to perform any logins into the system.
- Any user created for the system, or application shall not contain the word “admin” in it.
- Uniform IP address document shall be maintained.
- For assessment of policies implementation in firewall/routers/switches necessary audit shall be conducted after site acceptance test (SAT) only.
- Policy implementation audit must be conducted periodically (quarterly) by the contractor and report to be submitted to owner.

- All the external traffic destined to control center shall be routed through firewall only.
- Automatic report/log generation for every device shall be provided.
- All the proposed cyber security products OEMs shall have their own threat intelligence platform.
- All measures must be taken to prevent intrusion in existing communication network of POWERGRID/State/Constituents from UNMS side.

4.7 Monitoring and Compliance Manager of Critical Infrastructure Protection Standards.

A dedicated software utility/application shall be deployed in the system as part of U-NMS having following features:

- Proactive management of threats through automated collection, and delivery of identified patches (all major operating systems and applications) across delivered networks.
- Complete network-based scanning enabling assessment and analysis of threats impacting network.
- Configurable monitoring to enable Regulatory and standards-based assessment of end points compliance.
- Create custom remediation packages to address recurring configuration issues, remove unauthorized files and applications, and patch software.
- Robust data warehouse that enables creation and sharing of reports on all aspects of the system's remediation efforts in support of policy compliance.
- Comprehensive - software that streamlines and automates audit workflows and IT risk management to provide crucial visibility across the IT environment and ensure compliance with identified regulations, mandates and internal policies.
- Policy-based enforcement of application use to secure endpoints from malware, spyware and unwanted or unlicensed software.
- Policy-based enforcement of removable device use to control the flow of inbound and outbound data from endpoints.
- Asset Discovery - scan network and auto-discover the assets, saving hours of manual effort, and increasing trust in the identification of systems and software in delivered environment.
- Continuous Monitoring - continuously collect detailed status information on all critical cyber assets and immediately detect any changes.
- Automated Assessment - automatically aggregate and analyse security data and alert on suspicious events or modifications that impact compliance status.
- Audit-ready Evidence - quickly generate reports and dashboards that fully document, by requirement, compliance with security controls and processes.

4.8 Configuration management server Cum Centralized Management Console (CMC)

The CMC shall facilitate following activities:

- Security / Monitoring to protect systems and network from unauthorised access, manage user access, authorising rights and privileges.
- Inventory Management to collect information about computers in the system such as processors, memory, peripherals and processes running on computers.
- Performance Management to monitor system and network performance as specified.
- Fault Management to recognise, log and identify fault on U-NMS network and connected machines, nodes, devices.
- Facilitate as universal interface to determine and resolve IT issues quickly across servers, storage, network and Workstation.

The network management software shall be based on the secured version of Simple Network Management Protocol. The CMC system shall have a user-friendly user interface. The CMC shall not impact the availability and performance of U-NMS system

The CMC shall monitor from single dashboard and correlate the performance, resource usages and error statistics of all the servers, workstations, routers and LAN devices including proposed Employer/Owner networks extension :-

- i) Utilization (CPU and/or channel time being used as applicable) for
 - Servers, Workstations, Storage Devices (SAN, NAS, HDD, etc.)
 - LAN, Router, Switches
 - Data Links
- ii) Memory utilization, Auxiliary memory I/O utilization, of
 - Servers and Other critical nodes
 - Mass Storage Devices

The CMC Software shall:

- (a) Maintain performance, resource usage, & error statistics and present this information via displays, periodic reports, and on-demand reports. Apart from real-time monitoring, the above information shall be collected and stored at user configurable periodicities i.e. 5 minutes to 60 minutes. The historical data shall be stored for a period of one year at a periodicity of 5 minutes. CMC shall be able to generate reports regarding utilization of RAM and CPU. Export of this data shall be possible in ".csv", ".xls" formats.
- (b) Maintain a graphical display for connectivity and status of servers and peripheral devices for local area network. Issue alarms when error conditions or resource usage problems occur.

- (c) Report on application, server and network events from a single console, for faster triage and diagnostics, compliance to provide the IT search and intelligence analytics. The period over which the statistics are gathered shall be adjustable by the user, and the accumulated statistics shall be reset at the start of each period. The statistics shall be available for printout and display after each period and on demand during the period.

4.9 Database development tools

The Contractor shall provide all necessary software tools for the development and maintenance of the U-NMS system, Historian and other databases at UNMS Centre.

This tool shall be capable of managing the entire system database. The database development software tool delivered with the U-NMS system shall be used to generate, integrate and test the database.

The database tool should have facility to export and import model files as per applicable standards.

This tool shall contain database structure (format) definitions and all initialisation data to support the generation of all run-time databases required to implement the system's U-NMS functions. The tool shall include consistent procedures to manage and access the databases regardless of the location of the data or the residency of the database management functions within UNMS Centre. All exchange, co-ordination and procedure required across UNMS Centre shall be independent of each other. This tool shall allow following modes:

- Incremental data exchange of a function.
- Complete data exchange of UNMS Centre.

Reasonability, integrity, and referential integrity checks shall be made on user entries to detect errors at the time of entry. Invalid entries, such as entering an invalid data type or attempting to define contradictory characteristics for a database item, shall be detected and reported to the user in an error message. Help displays shall be available to provide additional, detailed information to the user on request.

Database development and Display tool shall be accessible from all the workstations supplied under the project and user can work on it concurrently.

4.9.1 Database Management

The database manager shall locate order, retrieve, update, insert, and delete data; ensure database integrity; and provide for backup and recovery of database files. The database manager shall generate and modify all U-NMS data by interfacing with all database structures. In systems with a distributed database, the database manager shall have access to all portions of the database wherever stored. The location of database items shall be transparent to the user performing database maintenance.

Execution of the database manager in any server of the system shall not interfere with the on-line functions of the U-NMS system including the normal updating of each server's real-time database. In a main server, database editing shall be limited to viewing functions, database documentation functions, and functions that change the contents but not the structure of the database.

All newly defined points shall be initially presented to the user with default values for all parameters and characteristics where defaults are meaningful. It shall also be possible to initialise a new database point description to an existing database point description. The user shall be guided to enter new data, confirm existing data, and change default values as desired.

All required entries for any database item selected for changes shall be presented to the user. When parameters are entered that require other parameters to be specified, the additional queries, prompts, and display areas required to define the additional parameters shall be presented automatically.

The database manager shall include the mechanisms, in both interactive and batch processing modes, to perform the following functions:

- (a) Add, modify, and delete data sources such as data links, and local I/O.
- (b) Add, modify, and delete application program data
- (c) Create a new database attribute or new database object
- (d) Resize the entire database or a subset of the database
- (e) Redefine the structure of any portion of the database.

A utility function shall be provided that creates, from the run-time database, a source file suitable for submittal to the global database batch processing facility. This utility shall create a new global database file, suitable for editing, that reflects any changes made to the run-time database since the last time the database was generated.

4.10 Display Generation and Management

The Contractor shall provide necessary software tools preferably browser based for the generation and management of U-NMS system displays. Display fit, with proper utilization of space, clear visibility of analogs in display fit also with no unused space shall be provided.

U-NMS system displays shall be generated and edited interactively using this display generation software delivered with the system. The display generator and management features specified in the following paragraphs shall be available at the workstation console.

All displays, symbols, segments, and user interaction fields shall be maintained in libraries. The size of any library and the number of libraries shall not be constrained by software. The display generator shall support the creation, editing, and deletion of libraries, including copying of elements within a library and copying of similar elements across libraries. A standard set of libraries and libraries of all display elements used in the delivered U-NMS system shall be provided. All libraries shall have directories that list all elements contained in the library. These directories shall be displayable and printable on demand.

Displays shall be generated in an interactive mode. The user shall be able to interactively:

- (a) Develop display elements
- (b) Link display elements to the database via symbolic point names
- (c) Establish display element dynamics via database linkages
- (d) Define linkages to other displays and programs
- (e) Combine elements and linkages into display layers
- (f) Combine display layers into displays.

All workstation features and all user interface features defined in this Specification shall be supported by the display generator software. An audit trail of all interactive generations and edits shall be maintained by the display generator software. An audit trail of last 10,000 edit operations shall be maintained.

The display generator shall support the addition, deletion, and modification of segments, including the merging of one segment with another to create a new segment. Segment size shall not be limited. Segments shall be defined at an arbitrary scale factor selected by the user

-----**End of the Section**-----

PART- B SECTION-5

U-NMS HARDWARE SPECIFICATIONS

PART- B SECTION-5

U-NMS HARDWARE SPECIFICATIONS

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PART- B SECTION-5

U-NMS HARDWARE SPECIFICATIONS

5.0 General

This section describes the technical requirements of all the hardware envisaged for the U-NMS system. The minimum hardware quantity and specifications (RAM, Aux Memory, Interfaces etc.) for all the equipments are specified in relevant appendices of the technical specification. The Bidder shall assess the adequacy of hardware specified in the BOQ, which is minimum & if any additional hardware or higher end hardware configurations are required to meet all the requirements of the technical specifications, the same shall be included in the offer. The Bidder's proposal shall include necessary calculations to clearly establish that the proposed hardware meets the functional and performance requirements of the technical specification.

The bidders are encouraged to optimise the requirement of hardware for servers and processors where one or more applications can be combined or distributed in any combination with adequate redundancy meeting the specified requirement. However, certain applications are to be hosted on independent hardware.

The U-NMS System installed in the UNMS Centre shall constantly monitor the Communication Network elements as per Scope, provide services like Network Discovery, Inventory Management, Fault Management, Performance Management, Service Provisioning Management, Configuration Management, Trouble Ticketing, User Security Management and monitor availability, and provide exhaustive reporting facilities to operations as specified.

The UNMS Centre architecture shall be scalable with low latency and shall have high performance as specified. Intrusion Detection & Prevention System (IDPS) shall scrutinize all the traffic abnormal/unusual activities coming into the UNMS Centres from the external/internal network for any type of Cyber-attacks and shall keep log of it.

5.1 Technical Requirements for Hardware

All hardware shall be manufactured, fabricated, assembled and finished with workmanship of the highest production quality and shall conform to all applicable quality control standards International/National) of the original manufacturer and the Contractor. All hardware components shall be latest and suitable for the purposes specified. All hardware shall be of reputed make.

All hardware shall include self-diagnostic features. On restoration of power after interruption, they shall resume operation automatically. All servers, workstations and network equipments (Switches, routers, firewall etc.) shall be compatible for remote monitoring using secure SNMP (latest version). All hardware shall support both IPv6 and IPv4 as applicable.

The contractor shall ensure that at the time of final approval of hardware configuration and BOQ, all the hardware is as per the current industry standard models and that the equipment manufacturer has not established a date for termination of its production and consumables e.g. printer cartridges etc., are available with more than one supplier locally. Any hardware changes,

except version upgrade in same series, proposed after contract agreement shall be subject to the following: -

- a) Such changes/updates shall be proposed, and approval obtained from Employer along with the approval of Drawings/documents.
- b) The proposed equipment shall be equivalent or with better features than the equipment included in the Contract.
- c) Complete justification along with a comparative statement showing the original and the proposed hardware features/parameters including brochures shall be submitted to the Employer for review and approval.
- d) Changes/updates proposed will be at no additional cost to the Employer
- e) The porting of software shall be at no additional cost in case of replacement of hardware during the AMC period by contractor in consultation with owner.

5.1.1 Hardware Requirements

5.1.1.1 Generic Requirements

1. The UNMS Center Connectivity Architecture shall be flexible to meet network design requirements and shall be positioned in several hardware arrangements or be customized to fit specific requirements.
2. The Server access shall support multiple users with authentication. The authorizations and the privileges of the operators (Remote and Local) shall depend upon the Login and Password.
3. All hardware devices shall be supplied as per system requirement during implementation, Warranty and AMC period.

5.1.1.2 Reliability, Scalability, Performance and Backup Restore

1. High Availability and Disaster Recovery solution at all level (Applications/Web/Database Servers, All Network/IT Infra components) shall be provided.
2. The supplied U-NMS System shall be able to operate 24x7 with 99.9% availability or better.
3. The implementation of the hardware and software configuration shall allow for future expansion and be able to handle maintenance with minimum disruption to the production environment. Staging and Testing & Development shall be in place to cater to the need.
4. Single point of failure to be taken care and shall have the capacity for fail-over. Any failure in the individual module shall have a minimum impact on the entire system and shall not affect the availability & performance of the services.
5. System shall be scalable, and it shall be possible to add additional resources/applications/databases with the network (NE/NMS) and system users.

6. System shall be able to handle performance during all parallel activities that includes users performing large reports fetching activity.
7. Data consistency checks and cleansing shall be performed on a regular basis to prevent corruption. Solution shall be able to recover point-in-time due to hardware or software failure(s).
8. System shall maintain data integrity in case of failure of a single component.
9. Automatic notifications mechanism of single/complete failure shall be provided.
10. System shall provide the single point capability for backup and recover the application and databases. The System shall have suitable Backup mechanism for taking backup of data and the duration shall be configurable. It shall be possible to take back up at any interval either automatically and under operator control. Incremental backup over a configurable period shall be possible. It shall be possible to test the full backup with hot Standby System.
11. The system shall provide capability for remote system administration. The system shall provide the ability for system administrators to logon and administer the system from location other than the system console.
12. Contractor should provision the Hardware Sizing & Software licenses for expandability as per relevant appendices of the technical specification.

5.2 Hardware Configuration

In this technical specification all hardware has been broadly classified as “Server” and “Peripheral device”. The term “server” (also referred as “processor”) is defined as any general-purpose computing facility used for hosting application functions as defined in the specification. The servers typically serve as the source of data, displays and reports. The term “Peripheral Device” is used for all equipment other than servers. Peripheral device includes Workstation consoles, WAN Router, LAN, printer, Storage, Firewall, Furniture, Laptop and Video Wall system (VWS) etc.

The redundant hardware such as Servers, Firewall, and LAN etc. shall work in hot standby manner. All the servers and networking equipments (Firewalls, LAN equipments etc.) shall be mounted in rack panel. The typical hardware architecture is attached at relevant Appendices of technical specification. Processor with Turbo boost option, meeting the requirement of technical specification, is acceptable.

All SFPs to be supplied in UNMS system shall be single mode.

5.3 Servers

The Servers shall have provision for expansion of the Auxiliary Memory and Main memory (RAM) by 100% of the delivered capacity. This expandability shall be possible at site with addition of plug in modules only. Initially USB Ports of all workstations shall be disabled.

- a. The servers shall be sized such that its processing capacity utilization should not exceed 25% of total processing capacity at peak load.

- b. Rack Mountable Servers: Servers shall be mounted in a rack (panel) and a single rack mountable TFT monitor, keyboard and mouse using IP Based KVM switch to access all servers & peripherals in the panel. Further, a server management console shall be installed to access all servers centrally. However, the grouping of servers in a rack shall be such that the main and hot standby servers for a system function are located in different panels.
- c. All servers shall have dual redundant power supplies, capable to operate on single power supply module and there shall not be any interruptions in the operation of servers when there is a failover between the two AC Power Supply of the server.
- d. Blade Servers: Servers shall be accommodated in (8/16) slot chassis of mounting in rack (panel) and a rack mountable TFT monitor, keyboard and mouse using IP Based KVM switch to access all servers & peripherals in the panel.
- e. Multiple tier of each application (Web/Application Server and Database Server) shall be deployed on separate server/ node. However, contractor can configure Web/Application/Database server tier of different Applications on same Server / mode with independent VMs.
- f. All servers shall be hot swappable, have backplane redundancy, dual power supplies and be capable to operate on single power supply module. There shall not be any interruptions in the operations of servers when there is failover between the two AC Power Supply of the server.
- g. Servers supplied shall be compatible to connect with external storage and other networks components identified in the BOQ, necessary additional hardware (if any) required for connectivity shall be part of servers.
- h. Servers quoted shall have a product support roadmap of minimum 7 years as on the date of bid submission. Bidder shall submit OEM undertaking for the same with the bid.
- i. Servers shall be configured as per the sizing given by the respective software OEM
- j. The Server shall support Ethernet and fiber channel connectivity.
- k. The Server shall be configured to provide for port level redundancy.
- l. It shall support remote/virtual KVM capability from an external keyboard, video monitor and mouse to all blades installed in the chassis through the management controllers and shall support virtual media for DVD access.
- m. Virtualization is not mandatory. Bidder can offer a Solution Architecture that meets the end objectives with or without virtualization. If bidder opt for virtualization, The Server shall be provided with hypervisor to enable provisioning & monitoring multiple virtual machines (VMs) on the Server. It should provide distributed RAID and cache mirroring for intelligent placement of VM objects across disks, hosts and server racks for enhanced application availability and achieve almost zero data loss with almost zero downtime in case of disk, host and network or rack/chassis failure ensuring system availability at 99.9% or more.

5.4 Video wall System (VWS)

The contractor shall provide a video wall system based on modular high resolution LED based rear projection technology. The VWS will be used to project displays of communication system independently of workstation console. All the operations envisaged from workstation console

shall be possible from VWS also. The VWS shall also display video signals (CCTV/DTH) and other Laptop Computer Feeds. For the above purpose, it shall be ensured to connect different sources through HDMI for at least five number of sources apart from U-NMS System.

The VWS shall enable users to display inputs from multiple sources/applications simultaneously in freely resizable and repositionable windows on entire display area to enable effective collaboration and faster decision making.

The Contractor shall supply all necessary hardware and software, including display controller, base stands, multi-screen drivers, adapters and memory to seamlessly integrate the video wall system with the user interface requirements described in the specification. The VWS should necessary LAN Port as per requirements of U-NMS System architecture.

The video wall systems shall be rear projection systems and shall be complete with all projection modules, supporting structures, cooling system and cabling. Design & installation of the video wall systems shall be coordinated with the Employer during project implementation.

The VWS controller shall synchronize its timing with U-NMS Systems. The Supports structure shall also accommodate communication System availability, Time & Day. This facility shall be placed on top/side of VWS. The system shall support a flicker free image on the wall.

The VWS shall provide sharing of on-screen content on remote displays. Message ticker facility shall be provided to display the user entered highlights.

The type test report shall be provided for VWS and accessories during engineering approvals. The type test should be carried out at nationally/internationally accredited labs.

5.4.1 VWS Module:

The requirements for each modular VWS wall are as follows:

- a) The VWS shall be a seamless rectangular array wall. The screen shall not contain any holes, or screws in the active viewing area.
- b) The screens shall be capable of displaying full resolution of the source.
- c) The configuration of the VWS wall (no. of cubes and size of each cube) is defined in the Bill of Quantity. The height of VWS above the ground level shall be in accordance with the layout of the control room and available clear height.
- d) The VWS wall should be rugged in nature and shall be designed for 24x7 operational environments. Necessary cooling arrangement shall be provided with the VWS. The air-conditioned environment in the Control room shall be provided by the Owner/Employer.
- e) The VWS shall be designed to prevent dust ingress.

5.4.2 VWS wall Management Software:

The VWS wall Management Software shall have the following features:

- a) The management software shall be able to preconfigure various display layouts (arrangement of different windows) and access them at any time with a simple mouse click. The window can be of different size and could contain display from different applications/sources.

- b) The management software shall enable the users to see the desktop of the VWS wall remotely on any Windows based PC connected with the Display Controller over the Ethernet and change the size and position of the various windows being shown.
- c) The management software shall enable various operators to access the display wall from local keyboard and mouse of their Windows workstation connected with the VWS Controller over the LAN.
- d) The management software shall be able to push the screen content of a Windows PC / workstation to be shown on the Display wall in scalable and moveable windows in real time environment. The Windows PC/workstation shall be connected to the local Display Controller over LAN.
- e) The Wall Management software shall allow display of video/data windows inside other graphic windows and it should be possible to configure the video/data windows to always remain on top while the operator works on the windows below.
- f) The wall management software shall support open APIs to enable system integrators to integrate it with their Software.
- g) The Wall Management software shall allow scrolling ticker messages to be sent to VWS. The ticker messages shall be easily modified and enterable through file management programs as well as manually. The ticker message text shall be at least 132 characters, 5 such ticker messages shall be possible at the time as per VWS wall.

5.4.3 VWS diagnostics and maintenance

The Diagnostic software shall perform health monitoring that allows timely detection of faults and provide at least the following:

- a) Cube health status
- b) LED age, expected life left
- c) Monitoring of critical Cooling
- d) Selected inputs and presence of sources on either input
- e) Brightness level & adjustment

The VWS maintenance Software shall allow commands on wall level or cube level or a selection of cubes for at least the following:

- a) Switching the entire display wall or display cube or a selection of cubes ON or OFF.
- b) Provide tool for adjustment to keep the wall picture uniform over time.
- c) Changing the active input (of the two present DVI inputs).
- d) Fine tune color of each cube

The VWS must allow easy removal of the components for maintenance.

5.5 Networking Equipments

5.5.1 Firewall

Firewalls shall be provided as per BOQ. It is required that both side firewalls (Internal and External) are supplied from two different manufactures. All firewalls shall be hardware box as per the requirements mentioned in relevant appendices of the technical specification.

5.5.2 LAN Switches

Servers and peripheral devices are connected to each other on a copper based local area network (LAN). Dual LAN is envisaged for the System at Main UNMS Centre and Single LAN for the backup UNMS Centre. LAN switches shall be as per the features mentioned in relevant appendices of the technical specification.

5.5.3 WAN Routers

Routers shall be capable for data exchange between UNMS Centres, Remote VDUs over various communication media such as copper cable, PSTN /leased line, fibre optic cable, VSAT etc. Routers shall have the built-in firewall features as required.

Router and firewall shall be provided with necessary license support till the completion of maintenance period. There shall be 50% spare ports.

Necessary control should be applied on the router to stop unwanted traffic and attacks at the perimeter itself. In the secure configuration of a router, the following strategies should be considered.

- a) Deploy proper access management and avoid remote administration.
- b) Enable secret password.
- c) Change default SNMP community string.
- d) ACLs (Access Control Lists) should include
 - Apply egress/ingress filter
 - Filter all RFC 1918, 3330 address space and special/reserved address
 - Permit the required services for the required IP addresses only
 - Deny everything else.
- e) Turn on logging to a central syslog server.
- f) Router for external world/Internet connectivity shall support Multi-Homing (Single Link – Multiple IP addresses, Multiple Links – An IP address, Multiple Links – Multiple IP addresses etc.) also in addition to above feature and shall have adequate number of ports to support it with minimum three Internet Service Providers (ISP).

5.5.4 Intrusion Detection and Prevention System (IDPS)

The contractor shall provide a Network-based intrusion detection and prevention system (NIPS) coupled with the Firewall solutions to detect and prevent intrusion, worm, virus etc. Definition updates for virus, signatures, software patches etc. shall be done up to AMC period. It is required that the firewalls (Internal) and the Firewall (External) are supplied from two different manufacturers.

5.6 Storage Area Network (SAN) based Storage

A SAN (Storage Area Network) based storage shall be provided which shall be sized adequately and shall be used for online storage and all online data backup. Historian shall be connected to the servers through dedicated Fiber optic or Ethernet Port as applicable. The historian system shall facilitate Owner's Application data storage also. The sizing of the same shall be suitably sized by the contractor to meet the specification requirements. There shall not be any single

point failure i.e. there shall be zero down time with single element failure It shall be possible to take and store image backup of all servers & workstations on it. The SAN shall facilitate Employer's Application Data Storage also.

5.6.1 SAN Switches

The switch shall be provided with fibre cables/ cat 5e/6 cables of appropriate lengths for all active ports / switch ports as to connect to servers and SAN storage.

5.6.2 Network Area Storage (NAS)

A NAS shall be provided for storing image back up of all servers and workstations along with user data. It should be possible to restore or recover any software/system at a selected time from back up.

5.6.3 Tape Library

Tape library shall be used for archiving of data available on SAN. It shall schedule the archiving activity. Based on the schedule, archiving activity shall be initiated automatically.

5.7 Workstation Consoles

Workstation console shall consist of a workstation driving one or more monitors, a single keyboard and a wireless mouse. The user shall be able to switch the keyboard and mouse, as a unit, among all the monitors at a console seamlessly. All workstation consoles shall support full graphics displays. Each workstation in the control room shall be provided with two speakers for alarming as per specification. In addition to the speakers, the contractors shall provide all other interface hardware, such as cables and connectors as required with touch screen.

5.8 Remote Consoles

The remote console shall be provided for remote viewing wherein the workstation is a part of monitor structure/ frame for 55" wall mounted video wall, with in-built CPU or Separate CPU shall be provided along with the display.

5.9 Centralized Management Console (CMC)

A separate appliance/server/ machine shall be supplied to be used as Centralized Management console for the HIDS, NIPS and firewall & Anti APT (Advance Persistent Threat) Device and Router cum firewall. The management console shall perform the following functions:

- Create and deploy new policies.
- For Centralized Logging of messages from all systems across the network as a Central Syslog server (in line with CERT-In Guidelines).
- Collect and archive audit log for post event analysis.
- Maintain an Integrated Event Database.
- Provide an integrated Reporting System.
- Getting Virus definition, signature, patches etc. update from internet and updating the system automatically.
- Keep latest copy of the definitions and configurations defined in respective network device e.g. routes/configuration defined in Routers, policies defined in firewalls, etc.

- Cyber Security related performance should be monitored in CMC.
- Proactive management of threats through automated collection, and delivery of identified patches (all major operating systems and applications) across delivered networks.
- Complete network-based scanning enabling assessment and analysis of threats impacting network.
- Configurable monitoring to enable Regulatory and standards-based assessment of end points compliance.
- Create custom remediation packages to address recurring configuration issues, remove unauthorized files and applications, and patch software.
- Robust data warehouse that enables creation and sharing of reports on all aspects of the system's remediation efforts in support of policy compliance.
- Comprehensive - software that streamlines and automates audit workflows and IT risk management to provide crucial visibility across the IT environment and ensure compliance with identified regulations, mandates and internal policies.
- Policy-based enforcement of application use to secure endpoints from malware, spyware and unwanted or unlicensed software.
- Policy-based enforcement of removable device use to control the flow of inbound and outbound data from endpoints.
- Asset Discovery - scan network and auto-discover the assets, saving hours of manual effort, and increasing trust in the identification of systems and software in delivered environment.
- Continuous Monitoring - continuously collect detailed status information on all critical cyber assets and immediately detect any changes.
- Automated Assessment - automatically aggregate and analyze security data and alert on suspicious events or modifications that impact compliance status.
- Audit-ready Evidence - quickly generate reports and dashboards that fully document, by requirement, compliance with security controls and processes.

5.10 Colour Laser Printer:

All printers shall be interfaced Ethernet LAN. Except for output capabilities unique to any printer type (such as extended character sets or graphic print capabilities), there shall be no limitations on the use of any printer to perform the functions of any other printer.

5.11 Furniture

The contractor shall provide furniture as per the following specifications. All furniture shall be of reputed make and shall be complied with the latest version of standard ISO 11064.. However the specific design, finish and color of all furniture shall be subject to Employer's approval.

a) Workstation desk:

Each workstation/ shall be provided with a suitable desk as follows:

- Sectional frame suitably clads with hardwood or hard wearing material.
- Desktops of a durable, scratch resistant, non-reflecting finish of suitable thickness.
- Proper Channels for Power, LAN and Telephone cabling with 100% spare capacity. i.e. integrated cable management system shall be in place.

- Adequate space shall be provided on the desktop for writing area, to accommodate the operator workstation, mouse, telephone console and other miscellaneous items.
- Drawers, shelves and miscellaneous fittings.
- Access shall be allowed for maintenance to equipment mounted on or in the desk. Pull out Drawer, Doors or removable panels shall be provided for this purpose.
- Adjustable (Height) Desks (sit-and-stand with step-less automatic height adjustment).
- Independent electronic powered height adjustment of monitors platform and work space.
- Monitor tilts variation with motorized height/tilt/depth adjustment.
- Programmable touch screen controls for operator desk management with automatic save PRESET options related to desk movements/position.

b) Chairs

- Two chairs shall be provided at each workstation.
- The chair shall be of high backed design with arm rests, covered in durable woven material.
- The chairs shall be of good quality and suitable for continuous use in UNMS system requirement without discomfort.
- Pneumatic Seat height and back angle adjustments shall be provided, capable of easy operation.

C) Furniture/Fixture for all other items, which are not mounted in racks (e.g. printers), shall also be provided by supplier.

5.12 Laptop for Maintenance

The Laptop to facilitate portability. Laptop shall have dual LAN interface and one serial interface. It shall be primarily used for configuration of LAN, routers, etc. No separate furniture is required for the processor terminal.

5.13 GPS based Time Facility

To determine Universal Coordinated Time (UTC) source, GPS based Time Facility shall be provided for UNMS Centre computer system. The GPS system shall be equipped with a controller and dual receiver. The time receiver shall include propagation delay compensation and shall include an offset to permit correction to local time.

The time receiver shall detect the loss of signal from the UTC source. A loss-of-signal shall be sent to the computer systems and used as a telemetry failure indication and result in an alarm in the U-NMS system.

The GPS system receiver unit shall have digital displays for viewing UTC day of the year, time and availability display. All required interface in this regard should be included in the scope of supply.

5.14 Power Supply for UNMS Centre equipment

The computer system should be suitable for operation with single-phase, 230 +10% Vac, 50 +5% Hz power supply. The UPS system comprises of redundant UPS operating in parallel and shall be used to ensure uninterrupted & regulated power supply to the computer systems. The

Contractor shall provide additional fuses, switches and surge protection, if necessary, to protect the computer system hardware. All cables supply, laying & their termination between UPS panel & computer system shall be in the scope of contractor.

5.15 Environmental Conditions

Equipment located in the computer/ control room shall operate over an ambient temperature range of 16°C to 30°C, with a maximum rate of change of 5°C per hour. Relative humidity will range from 20% to 80% non-condensing. Further, all Hardware to be supplied under the project shall be RoHS complaint (Restriction of Hazardous Substance) in Electrical & Electronics Equipment.

5.16 Acoustic Noise Level

The noise level of any equipment located in the server room shall not exceed 60 dbA measurements at three feet from the enclosure. The noise level of equipment located outside the server room shall not exceed 50 dbA three feet from the enclosure. Sound-deadening enclosures shall be provided where necessary to meet these requirements.

5.17 General Construction Requirements

The enclosures/panels, used for mounting or placement of equipment, shall be constructed in accordance with the following requirements.

5.17.1 Panels

In case the equipments are mounted in panel type of enclosures, then such enclosures shall be finished inside and out. All cabinet metal shall be thoroughly cleaned and sanded to obtain a clean, smooth finish. All surfaces shall be treated to resist rust and to form a bond between the metal and the paint.

Moving assemblies within the enclosure, such as swing frames or extension slides, shall be designed such that full movement of the assembly is possible without bending or distortion of the enclosure or the moving assembly. Enclosures shall not require fastening to the floor to preclude tipping of the enclosure when the moving assembly is extended. No cables shall be visible, all cables shall be properly clamped, and all entries shall be properly sealed to prevent access by rodents.

Cooling air shall be drawn from the conditioned air within the room. Ducted or directed cooling air to the enclosures will not be supplied by Owner.

All wiring shall use copper conductors. Conductors in multi core cables shall be individually colour coded.

Wiring within the enclosures shall be neatly arranged and securely fastened to the enclosure by non-conductive fasteners. Wiring between all stationary and moveable components, such as wiring across hinges or to components mounted on extension slides, shall allow for full movement of the component without binding or chafing of the wire.

All materials used in the enclosures including cable insulation or sheathing, wire troughs, terminal blocks, and enclosure trim shall be made of flame retardant material and shall not produce toxic gasses under fire conditions.

The finish colours of all enclosures/panels shall be finalized during detailed engineering.

5.17.2 Enclosure Grounding

A safety ground in accordance with Indian standards shall be provided within each enclosure and shall connect to the ground (green) wire of the ac power input.

5.17.3 Interconnections

All signals cabling between component units of the computer systems shall be supplied by the Contractor. Plug-type connectors with captive fasteners shall be used for all signal interconnections. The connectors shall be polarized to prevent improper assembly. Both ends of each interconnection cable shall be marked with the cable number and the identifying number and location of each of the cable's terminations. Each cable shall be continuous between components; no intermediate splices or connectors shall be used. Terminations shall be entirely within the enclosure.

-----End of the Section-----

PART- B SECTION-6

CONFIGURATION CHARACTERISTICS

PART- B SECTION-6

CONFIGURATION CHARACTERISTICS

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PART- B SECTION-6

CONFIGURATION CHARACTERISTICS

The ability of the UNMS systems to perform their specified tasks under normal conditions and under conditions of hardware and software failure is of paramount importance to Employer/Owner. This section presents requirements for monitoring and managing the hardware and software configurations of these systems.

6.0 Redundancy

The UNMS system must be supported by sufficient hardware and software redundancy to ensure that no single hardware or software failure will interrupt the availability of the functions for a period exceeding the failover time.

The redundancy requirement for hardware of UNMS system at UNMS centres shall be as follows:

- i) **LAN switches:** The System shall have dual LAN architecture for systems. All LANs shall be configured as redundant. All equipments shall have dual LAN connectivity.
- ii) **Servers:** All the servers for critical applications shall be configured as redundant.
- iii) **Printers:** All Printers shall be non- redundant devices.
- iv) **Workstation Consoles:** These shall be configured as redundant devices.
- v) **GPS based Time facility & digital indicators:** The time and frequency system & digital indicators shall be configured as a non-redundant device.
- vi) **Routers:** Routers shall have physical redundancy as well as channel redundancy i.e. redundant channels of a remote destination shall be configured on different routers.
- vii) **Video Wall system (VWS) Equipment:** VWS equipment shall be configured as non-redundant device.
- viii) **Communication interfaces with other UNMS center computer systems:** The communication interfaces with other UNMS center computer systems shall be configured as redundant.
- ix) **Communication interface with Remote consoles:** The communication interfaces with Remote console shall be configured as redundant devices.

6.1 Server and Peripheral Device States

A server group is one or more servers that perform a subset of UNMS system or other application functions in either a primary/hot standby manner or distributed manner.

Server and device states shall identify the operating condition of each Server and peripheral device of UNMS systems and shall be used to determine the system's reaction when restart and failover operations take place. Server and device states shall be assigned by failover functions, restart actions, and by user command.

6.1.1 Server States

Each Server shall be assigned to one of the following states:

- (a) Primary: A primary Server performs any or all of the on-line functions described in the Specification
- (b) Hot Standby: A Hot Standby Server replaces a primary Server in the event of primary Server failure or upon user command. It shall communicate with the primary Server to maintain backup databases and monitor the state of the primary Server.
- (c) Down: A Server is down, when it is not communicating with the UNMS system and is not capable of participating in any system activity.

6.1.2 Peripheral Device States

Each peripheral device shall be assigned to one of the following states:

- (a) Primary: The primary peripheral device is logically attached to a primary Server or primary Server group. If the primary Server or primary Server group fails and its functions are reassigned to a backup Server or backup Server group, the peripheral device shall follow the reassigned functions.
- (b) Hot Standby: A Hot Standby peripheral device is used to replace a primary peripheral device in the event of primary peripheral device failure. It shall communicate with the primary Server or primary Server group to maintain its readiness to be assigned as a primary device.
- (c) Down: A down device cannot be accessed by the UNMS system.

6.1.3 Functional Redundancy

Every important function must be supported by sufficient hardware redundancy to ensure that no single hardware and software failure will interrupt the availability of the functions for a period exceeding the failover time.

Replacement of faulty items of the system and its restoration shall not result in any loss of functionality or performance. The standby elements of redundant system shall be fully monitored at all times.

Other functions are those that support maintenance and development of database, application software and training of users. No hardware redundancy is envisaged for these functions.

6.2 Server and Device Interconnections

Redundant interconnections shall be provided among all Servers within a Server group, among all Server groups, and among all Servers (including Server groups) and all workstations located in UNMS centre. The interconnections shall support Servers and peripheral devices data exchange over both the LANs. Recovery from a single LAN or any other interconnections failure shall not require any failover. Loading of both the LANs shall be equally distributed.

6.3 Backup Databases

The system shall maintain backup copies of all databases without requiring any manual intervention, so that system operations may continue in the event of Server, device or software failure. The backup databases shall be updated with the current contents of the primary databases such that all changes to a primary database are reflected in the backup database within 30 seconds of the change. The backup databases shall be maintained in such a manner as to be protected from corruption due to Server and device failure. Backup databases shall be preserved for system input power disruptions of any duration.

All Changes resulting from the addition or deletion of items in an existing database, structures and restructuring of databases shall be automatically backed up in the backup databases by the backup function.

6.4 Error Detection and Failure Determination

All Servers, devices, on-line functions, and maintenance functions in system shall be monitored for fatal and recoverable errors. All errors shall be recorded by the system for review by maintenance personnel. Each type of error (e.g., Server failure, memory access violation, device reply time-out, or message checksum error) shall be recorded separately with a date and time tag.

Failure monitoring logic shall be distributed within the computing network and shall detect all failures that affect the availability of network resources or services. Failure monitoring functions shall be independent of application function and user modes.

6.4.1 Server Errors

All fatal and recoverable errors of all Servers operating in the primary and hot standby states shall be detected and recorded by the UNMS system. Server failure shall be detected and annunciated to the user within 10 seconds of the failure.

6.4.2 Device Errors

All fatal and recoverable errors of all peripheral devices shall be detected and recorded. Each type of recoverable error shall be assigned a threshold by the programmer. Peripheral device (except printers) failure shall be detected and annunciated within 10 seconds of the failure.

6.4.3 Software Errors

Execution errors in on-line and maintenance functions that are not resolved by program logic internal to the function shall be considered as fatal software errors.

Fatal software errors shall result either in termination of the function or shall be handled as a fatal Server error. The action to be performed shall be defined by the programmer for each function. If the function is to be terminated, future executions of the function shall also be inhibited until the function is again initiated by the programmer.

On the occurrence of each fatal software error, Server and operating system error codes and messages shall be recorded in the UNMS system.

6.5 Server Redundancy and Configuration Management

When a failure of a primary Server in a redundant group is detected, the computer system shall invoke the appropriate server failure recovery actions. Failure recovery is the capability of automatically transferring the functions (failover) from primary hardware resources to secondary hardware resources or restarting the server when a failure-monitoring function detects a failure. The failover shall be the preferred failure recovery approach and restart shall only be used when failover is not possible.

After an error threshold-induced automatic transfer, the former primary server shall remain in an inactive (down) state so that a post-mortem analysis can be performed. A manual restart shall be necessary to bring it to the active ready state.

After a transfer caused by a Server failure or power loss, the former primary server shall either reboot into the ready state automatically or wait for manual intervention, depending on Employer's/Owner's configuration management set-up.

If all alternate Servers are unavailable when the operating Server fails, the system shall attempt to automatically restart operating Server a programmable number of times.

Failures of Servers operating in the hot standby states shall not initiate failover or restart actions. The UNMS system shall only change the state of failed processor to 'DOWN'.

When a failure of a primary Server in a non-redundant group is detected, the computer system shall invoke restart actions. Functions assigned to a failed Server in a non-redundant group may be lost until the failed Server is restored to service.

All Server failures shall be enunciated by alarms. The alarms shall identify the failed Server(s), all Server state changes, and the success or failure of any restart and failover operations. For any server crash, manual transfer or threshold-induced transfer a crash dump file shall be automatically generated for analysis using standard interactive support tools. All such system events and crash dump file shall be transferred to Historian system automatically.

6.5.1 Server Failover

A failover to an alternate Server shall occur, as a minimum, under any one of the following situations:

- Non-recoverable failure of a server performing an important function
- User request for a transfer of servers
- Failure of a periodic function to execute on schedule.

In the event of server failover, the functions of the failed Server shall be restarted in a working/functioning Server. Immediately upon detection of a failure, the failed Server's state shall be changed to down state. All devices assigned to the failed Server shall be reassigned to its hot standby Server without any manual intervention.

The on-line functions of the failed Server, having execution periodicity less than or equal to 30 seconds, shall be assigned to its hot standby Server within 30 seconds of the failure except for Historian System. In case of failure of Historian System; the Historian System data shall

be stored in the UNMS system till the failover of Historian System is completed to avoid data loss. This stored data shall be transferred to the Historian System automatically after restoration of Historian System.

The on-line functions of the failed Server, having execution periodicity greater than 30 seconds, which were in progress at the time of failover or were missed during the failover, shall be assigned to its hot standby Server within 120 seconds.

6.5.2 Restart

Restart involves the ability of any server to self-detect its non-recoverable errors and to attempt to restart the UNMS system functions.

The restart logic shall determine the desired state of the failed Server and the on-line function(s) to be initiated in this Server. The restart logic shall also preclude conflicts among Servers, such as assigning too few or too many Servers to the primary state and the erroneous duplication of functions in multiple Servers. All maintenance functions executing in the restarting Server shall be suspended to expedite the restart process.

Restart shall include initialization of the UNMS function(s) and internal parameters, updating of databases, establishing access to peripheral devices, and execution of the function(s).

6.5.3 Server Start-up

A Server start-up shall be performed when commanded by a user and when Server input power is interrupted and restored such that the operating environment of the Server is established prior to restarting the on-line functions. Establishment of the operating environment may include execution of self-diagnostics, reloading the operating system and system services, and connection to and verification of communications with all nodes on the UNMS center computer system LAN. The server start up shall be completed within 5 minutes with all functions scheduled for execution.

6.5.4 System Power-On Start-up

The UNMS system shall automatically restart itself when input power is interrupted and restored. System start up shall include Server start up, initialization of all network devices, initialization of peripheral devices, initialization of all communications with data sources and other UNMS centers, resumption of all UNMS functions and notifications to the users that start-up has been completed. System power-on start-up shall be completed within 10 minutes.

6.6 Peripheral Device Redundancy and Configuration Management

When failure of a redundant peripheral device is detected, the UNMS center computer system shall automatically invoke the appropriate device failover actions so that on-line functions, which are using the failed device, are preserved.

When failure of a non-redundant device is detected, the UNMS system shall not invoke Server failover or server restart actions. On-line functions using a failed, non-redundant device may be lost until the failed device is restored to service.

All device failures shall be annunciated by alarms. The alarm text shall identify the failed device(s), all device state changes, and the success or failure of any device failover operations.

6.6.1 Device Failover

The device failover shall result in an orderly transfer of operations to a hot standby device in the event of failure of primary device. The device failover function may replace a failed device with an identical hot standby device or with a hot standby device that is different from the normal device.

Device failover actions shall be completed and the hot standby device shall be operating within 30 seconds of detection of the device failure.

6.7 Configuration Management Displays

UNMS system shall include schematic and tabular displays for configuration management. The displays shall depict the state of each Server, peripheral device, and their interconnections, and include facilities for initiating user-commanded changes to the state and assignment of devices to Servers and user-commanded restarts, Server and device failover and Server start-ups. Displays to view and control the status of backup databases shall also be provided. Status of UNMS functions (Primary/ hot standby) shall be displayed on the display.

6.8 Data synchronisation between Main and Backup UNMS centres

Both the Main and the Backup systems shall be operational during normal circumstances. The Main UNMS center shall update the Backup UNMS Centre automatically. Main UNMS Centre shall be primary UNMS Centre for operations at all times, when available. The sync periodicity of data at Backup UNMS Center from Main UNMS Center shall be as follow:

- Real time data shall be updated every 10 second
- Historian System data shall be updated at least every hour.

In case of failure of the Main UNMS Centre, the Backup UNMS Centre shall take over operations and functions of Main UNMS Centre. When Main UNMS Centre recovers from failure, Backup UNMS Centre shall update all data, including Historian System data, at Main UNMS Centre.

The real-time databases (except the databases used for development, display building, historical data) at both the UNMS centres shall be synchronised (integrity check) every 600 seconds.

The failover shall not be affecting the data communication and they would continue reporting to the respective UNMS centre and no data loss at Main and Backup UNMS centre shall occur.

Both the Main and Backup UNMS Centre shall monitor each other's availability at least every 120 seconds by communicating to each other. An alarm shall be generated when a failure of the other UNMS centre is detected.

-----**End of the Section**-----

PART- B SECTION-7

INSPECTION AND TESTING

PART- B SECTION-7

INSPECTION AND TESTING

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PART- B SECTION-7

INSPECTION AND TESTING

7.1. Inspection, test and availability

All materials furnished and all work performed under this Contract shall be inspected and tested. Should any inspections or tests indicate that specific hardware, software, or documentation does not meet the specified requirements; the appropriate items shall be repaired, replaced, upgraded, or added by the Contractor as necessary to correct the noted deficiencies. After correction of deficiencies, all tests necessary to verify the effectiveness of the corrective action taken shall be repeated. Deliverables shall not be shipped until all required inspections and tests have been completed, all deficiencies have been corrected to Employer/Owner's satisfaction and the hardware and software have been approved for shipment by Employer/Owner.

7.2. Inspection

Employer/Owner representatives shall be allowed access to the Contractor's facilities during system manufacturing and testing and to any facility where hardware or software is being produced. Office facilities, equipment, and documentation necessary to complete all inspections and to verify that the U-NMS system is being produced and maintained in accordance with the Specification shall be provided to Employer/Owner's representatives by the Contractor.

Employer/Owner representatives shall be allowed to review and verify the functional implementation of the U-NMS system software informally in conjunction with scheduled project meetings at the Contractor's facilities. No test plans, procedures or reports are required to support these informal software demonstrations.

Employer/Owner representatives shall be allowed to inspect the Contractor's hardware and software quality assurance standards, procedures, and records.

The inspection rights described above shall not apply to subcontractors supplying standard computer hardware, peripheral equipment, and third-party software products. The inspection rights shall apply to subcontractors developing new software for inclusion in the U-NMS system and to sub-system suppliers.

Generally, equipment items shall be inspected and tested as part of the hardware integration demonstration described in coming sub sections, and third-party software products shall be tested as part of the functional performance test described in coming sub sections.

7.2.1. Inspection Certificate

The Contractor shall give the Employer/Owner 14 days written notice of any material being ready for testing in India and six weeks for outside India. Such tests shall be to the Contractor's account except for the expenses of the Employer/Owner. The Employer/Owner, unless witnessing of the tests is waived, will attend such tests on the scheduled date for which Employer/Owner has been so notified or on a mutually agreed alternative date.

The Employer/Owner shall, within 14 days from the date of inspection as defined herein, give notice in writing to the Contractor of any objection to any drawings and all or any

equipment and workmanship which in his opinion is not in accordance with the Contract. The Contractor shall give due consideration to such objections and shall make the modifications that may be necessary to meet said objections. When the factory tests have been completed at the Contractor's or Subcontractor's works, the Employer/Owner shall issue a certificate to this effect within 14 days after completion of tests but if the tests are not witnessed by the Employer/Owner, the certificate shall be issued within 14 days of receipt of the Contractor's Test Certificate by the Employer/Owner. The completion of these tests or the issue of the certificates shall not bind Employer/Owner to accept the equipment should it, on further tests after erection, be found not to comply with the Contract. In all cases where the Contract provides for tests, whether at the premises or works of the Contractor or of any Subcontractor, the Contractor except where otherwise specified shall provide free of charge items such as labour, materials, electricity, fuel, water stores, apparatus and instruments, as may be reasonably demanded by the Employer/Owner or his authorized representative to carry out effectively such tests of the equipment in accordance with the Contract and shall provide facilities to the Employer/Owner or his authorized representative to accomplish testing.

The inspection by Employer/Owner and issue of Inspection Certificate thereon, shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed Quality Assurance Program forming a part of the Contract. The Contractor shall keep Employer/Owner informed in advance of the time of starting of the progress of manufacture of material in its various stages so that arrangements can be made for inspection.

Record of routine test reports shall be maintained by the Contractor at his works for periodic inspection by Employer's/Owner's representative.

Certificates of manufacturing tests shall be maintained by the Contractor and produced for verification as and when desired by Employer/Owner. No material shall be dispatched from its point of manufacture until it has been satisfactorily inspected and tested. Testing shall always be carried out while the inspection may be waived off by Employer/Owner in writing only.

However, such inspection by Employer/Owner's representative(s) shall not relieve the Contractor from the responsibility for furnishing material, software, and equipment to conform to the requirements of the Contract; nor invalidate any claim which Employer/Owner may make because of defective or unsatisfactory material, software or equipment.

7.3. Test Plans and Test Procedures

Test plans and test procedures shall be provided by the Contractor for all tests to ensure that each factory and site test is comprehensive and verifies the proper performance of the UNMS system under test. During the development of test plans and test procedures for the system, emphasis shall be placed on testing each conditional logic statement, checking error conditions, and documenting the simulation techniques used. The test plans and test procedures shall be modular to allow individual test segments to be repeated as necessary.

7.3.1. Test Plans

The test plans shall describe the overall test process, including the responsibilities of individuals and the documentation of the test results.

The following shall be included in the test plans:

- a) Test schedule on a day-by-day basis
- b) Responsibilities of Contractor and Employer/Owner personnel
- c) Record-keeping assignments, procedures, and forms
- d) Procedures for monitoring, correcting, and retesting variances
- e) Procedures for controlling and documenting all changes made to the hardware and software after the start of testing
- f) Block diagrams of the hardware test configuration, the external communication channels, and any test or simulation hardware.

7.3.2. Test Procedures

The test procedures shall describe the individual tests segments and the steps comprising each segment, particularly the methods and processes to be followed.

The test procedures shall include the following items:

- a) Name of function to be tested
- b) References to the functional, design, user, and any other documents describing the function
- c) List of test segments to be performed and the purpose of each test segment
- d) Set-up conditions for each test segment, including descriptions of the test equipment
- e) Descriptions, listings, and instructions for test software tools and displays if any.
- f) Step-by-step descriptions of each test segment, including user actions for each test step
- g) Expected results for each test segment, including pass/fail criteria
- h) Descriptions of the techniques and scenarios to be used to simulate system field inputs and controlled equipment
- i) Copies of any certified test data to be used in lieu of testing.

7.4. Test Records

Complete records of all factory and site acceptance test results shall be maintained by the Contractor. The records shall be keyed to the test procedures. The following items shall be included in the test records:

- a) Reference to appropriate test procedure
- b) Date of test
- c) Description of any test conditions, input data, or user actions differing from that described in the test procedure
- d) Test results for each test segment including a pass/fail indication
- e) Identification of Contractor's test engineer and Employer/Owner's representative if any.
- f) Provision for comments by Employer/Owner's representative.
- g) Copies of any variance reports generated.
- h) Copies of reports, display copies, and any other hardcopy generated as part of the test.

7.4.1. Reporting of Variances

Starting from the dry run test period, a variance report shall be prepared by Contractor personnel each time a deviation from the requirements of this Specification is detected in areas such as system functions, design parameters, performance, documentation, test plans, and test procedures. The report shall include a complete description of the variance, including:

- a) Sequential identifying number assigned to the variance
- b) Date and time the variance was detected
- c) Appropriate references to the test procedures and this Specification
- d) Description of test conditions at the time the variance was detected
- e) Identification of Contractor and Employer/Owner representatives
- f) Estimated date and time when variance is expected to be fixed
- g) Description of the corrective actions taken (to be completed as part of the variance resolution process)
- h) Dated signature lines for the Employer/Owner and Contractor representatives to signify reporting and correction of the variance.

Each variance shall be assigned to one of three classes defining the action to be taken to resolve the variance:

- a) Class 1: Testing will immediately stop and the Contractor will evaluate and correct the variance before testing is resumed.
- b) Class 2: Testing will continue and the variance will be evaluated and corrected by the Contractor at the end of the current session but prior to further testing.
- c) Class 3: Testing will continue and the variance will be evaluated and corrected at a mutually agreed upon time.

The class shall be assigned by the Contractor with Employer/Owner approval. Variance reports shall be available to Employer/Owner for review and comment at all times and shall be submitted by the Contractor to Employer/Owner at the start of the availability test. The Contractor shall maintain and periodically distribute variance summary that lists for each variance the report number, a brief description of the variance, its class, and its current status (open or resolved). A variance summary shall also be submitted with the progress report.

7.4.2. Resolution of Variances

All actions taken to correct variances shall be documented on the variance report by the Contractor. Sufficient information shall be provided to enable Employer's/Owner's representative to determine the need for and extent of retesting, the need for testing interactions of the correction with any previously tested hardware or software, and the need for updating appropriate documentation. A variance shall be deemed resolved after retesting has been performed to the satisfaction of Employer/Owner and the Contractor and Employer/Owner representatives have acknowledged correction of the variance on the variance report.

7.5. Test Initiation

The following conditions must be satisfied before starting any test:

- a) All test plans and procedures for the test shall be approved by Employer/Owner.
- b) All hardware and software engineering design change orders shall be incorporated into the system under test.
- c) All relevant documentation including drawings, lists of deliverables, and software functional and design documents, and user manuals shall be approved by Employer/Owner.
- d) A complete regeneration of the software under test for which source code is being supplied shall be performed immediately prior to the start of factory testing.
- e) All operating system parameters, files, and configuration information shall be saved to archive media so that the UNMS operating environment can be recreated starting with an un-initialized system. The existence and completeness of this data shall be demonstrated to Employer/Owner.
- f) All database, display, and report definitions shall be saved to archive media so that the databases, displays, and reports can be recreated if necessary.
- g) The image backup of all applications of UNMS system shall be taken on the archive media so that U-NMS system software can be regenerated if necessary.
- h) A complete dry run of each factory test (excluding the integrated system test) shall be conducted by the Contractor using the approved test plans and test procedures. Written certification that the dry run has been successfully completed shall be provided to Employer/Owner at least one week prior to the start of each factory test. At Employer/Owner's option, Employer/Owner representatives will witness and participate in the dry run of any test.

7.6. Test Completion

A test shall be deemed to be successfully completed only when:

- a) All variances have been resolved to the satisfaction of Employer/Owner.
- b) All test records have been transmitted to Employer/Owner.
- c) Employer/Owner acknowledges, in writing, successful completion of the test.

7.7. Test Suspension

Any time Employer/Owner representatives believe that the quantity or severity of variances warrants suspension of any or all testing, the test shall be halted, remedial work shall be performed, and the complete test shall be repeated. The repeat of the test shall be scheduled for a date and time agreed upon by both the Contractor and Employer/Owner.

7.8. Test Classifications

7.8.1. Factory acceptance Test (FAT):

The database, displays and the report formats developed by the contractor for the UNMS system under the scope shall be demonstrated and verified by the Employer/Owner

before factory testing.

The Contractor is responsible for conducting all factory tests as per approved procedure. Employer/Owner will witness all tests and will perform selected test procedures. Knowledgeable Contractor personnel shall be present at all times to assist Employer/Owner representatives with factory testing as needed. Employer/Owner will not accept un-witnessed test results of any hardware or software without previous written authorization.

Functions of U-NMS in Main & Backup configuration shall be staged and completely tested with simulated data at the Contractor's facility. The material inspection clearance certificate (MICC) for all hardware shall be issued only after successful completion of FAT as per specification. The data exchange with NMSs/ UNMS national shall be simulated in the factory test environment.

Each of the factory tests described below (i.e. the hardware integration test, the functional performance test, and the integrated system test, unstructured tests) shall be carried out under factory test.

7.8.1.1. Hardware Integration Test:

The hardware integration test shall confirm that the computer hardware conforms to this Specification and the Contractor-supplied hardware documentation. The hardware integration test shall be performed when the computer hardware has been installed in the Contractors factory. The operation of each item shall be verified as an integral part of the system. Applicable hardware diagnostics shall be used to verify that each hardware component is completely operational and assembled into a configuration capable of supporting software integration and factory testing of the system. Hardware shall be tested as per at least the test mentioned in table 7.4 but not limited to these tests.

Table- 7.4

1	Physical inspection for conformance to DRS, drawings and appearance of equipment
2	Power on self-test
3	Demonstration of functionality for information/data to be acquired from existing network elements of different make.
4	Demonstration of functionality for information/data to be exchanged from existing NMSs/EMSs of different make.

7.8.1.2. Functional Performance Test:

The functional performance test shall completely verify all features of the UNMS hardware and software as mentioned in other sections of the specification. As a minimum, the following items shall be included in the functional performance test:

- a) Inspection of all equipment for conformance to drawings/document and

- satisfactory construction and appearance
- b) Testing of the proper functioning of all software, including test cases with normal and exception user-entered inputs and responses
 - c) Simulation of local error and failure conditions.
 - d) Verification that ultimate expansion requirements are met.
 - e) Service Orchestration
 - f) Verification of different user interface reporting, e.g. V.24/V.35 etc. data channels, 64kbps channel, EI & Ethernet channel etc.
 - g) Verification of data link interfaces with other different vendor (at least two) NMS/EMS.
 - h) Verification of data link interfaces with other different vendor (at least two) NEs.
 - i) Verification of data link interfaces with other technology eg, MPLS, VSAT, Radio, Cellular etc.
 - j) Testing of all user interface functions, including random tests to verify correct database linkages
 - k) Testing of link and service availability (yearly/ monthly/ weekly) for various links of the network (Regional/National/Inter-Regional/ Cross-border).
 - l) Simulation of hardware failures and input power failures to verify the reaction of the system to server and device failure
 - m) Demonstration of all features of the database, display, and report generators and all other software maintenance features such as network topology showing links, various data and voice services delivered by the network, yearly/ monthly/ weekly availability of services etc.
 - n) Demonstration of the software utilities, libraries, and development tools.
 - o) Verification that the computer system meets or exceeds Employer/Owner's performance requirements
 - p) Verification of the accuracy of hardware and software documentation via random tests.
 - q) Verification of Cyber Security Compliance of the system as per latest DoT/MoP related guidelines.

7.8.1.3. Integrated System Test:

The integrated system test shall verify the stability of the UNMS hardware and software after the functional performance test has been successfully completed. During the integrated system test, all UNMS functions shall run concurrently and all Contractor-supplied equipment shall operate for a continuous 100-hour period. This minimum level of activity may be augmented, at the discretion of Employer/Owner, by other activities that represent normal day-to-day operation of the system as long as these activities are conducted in accordance with the training and documentation provided with the system. These other activities may include, but shall not be limited to, database, display, and report modifications, software development activities, configuration changes (including user-commanded server and device failovers), and the execution of any function described in this Specification.

The integrated system test shall assure Employer/Owner that the computer system is

free of improper interactions between software and hardware while the system is operating as an integrated unit. In case during the 100 hour period testing uncommanded functional restart or server or device fail occurs the test shall be extended by 24 hours each time such a fail over occurs.

Further the test shall not be conducted with the failed device.

7.8.1.4. Unstructured Testing

Periods of unstructured testing shall be allocated to allow Employer/Owner representatives to verify proper operation of the UNMS System under conditions not specifically included in the approved test procedures. Unstructured testing shall be conducted in compliance with the following conditions:

- a) A minimum of 25 percent of the actual test period shall be reserved for unstructured test of the system by Employer/Owner representatives
- b) The Contractor's test representative shall be present and the Contractor's other technical staff members shall be available for consultation with Employer/Owner personnel during unstructured test periods
- c) All simulation software, test cases, and other test facilities used during the structured portions of the factory tests shall be made available for Employer/Owner's use during unstructured testing
- d) Unstructured testing shall not begin prior to the start of the functional performance test
- e) Unstructured testing shall be allowed at Employer/Owner's discretion both at the end of a structured test segment and after completion of the functional performance test.

7.8.2. Site Acceptance Tests (SAT)

The Contractor's maintenance records shall be reviewed prior to site (also referred as site) testing to identify all hardware and software modified, repaired, or replaced between the completion of factory tests and the start of site testing. Interfaces to all communications circuits shall be established by the Contractor and the proper operation of these circuits shall be verified. For the purpose of interpreting the requirements for test plans, test procedures, test records, test initiation, and test completion, site testing shall be considered a single test accomplished for each computer system in three phases:

- a) Site Installation Test,
- b) Pre-site Performance Test, and
- c) Site Performance test.

7.8.2.1. Site Installation Test (SAT-I)

The site installation test shall provide verification that computer system is operationally equivalent to the system that successfully completed factory testing. The responsibility for the conduct of the site installation test shall rest with the Contractor. Employer/Owner will witness all tests and will perform selected test procedures. Knowledgeable Contractor representatives shall be present at all times to

assist Employer/Owner representatives with the testing. The site installation test shall consist of the functional performance test to confirm operation of basic functions such as data acquisition, user interface, and the support and utility functions. All hardware shall be tested by running diagnostics. The exact content of the site installation test shall be determined jointly by the Contractor and Employer/Owner.

7.8.2.2. Pre-site Performance Test (SAT-II)

After the site installation test, the Contractor shall:

- a) Verify the operation of data links and remote consoles
- b) Correct and update the database, reports, and displays
- c) Install and test employer/owner-developed software if any and
- d) Establish connectivity & integration of supplied system with Existing NMS/EMS and independent NEs or as applicable.
- e) Verify Cyber security compliance of the system as per latest DoT/MoP related guidelines.

The Contractor shall be responsible for providing and installing corrections for all variances found during this period prior to the start of the site performance test. Further the contractor shall also train the dispatchers before site performance test starts.

7.8.2.3. Site Performance Test (SAT-III)

After the completion of activities as per relevant section of the specification, the Contractor shall conduct the site performance test to verify those parts of the functional performance test (as per relevant section of the specification) that were not fully tested as part of the site installation test. All variances found during this period shall be fixed by the Contractor or otherwise resolved to Employer/Owner's satisfaction prior to the start of the availability test.

The site performance test shall concentrate on areas of UNMS operations that were simulated or only partially tested in the factory (e.g., system timing and loading while communicating with data links and system reaction to actual site measurements and site conditions). The validity of factory test results determined by calculation or extrapolation shall be examined. The Contractor shall be required to repeat selected portions of the site installation test during the site performance test if Employer/Owner believes that previously tested functions have since been modified and are not operating in accordance with the Specification. Provisions for unstructured testing by Employer/Owner personnel shall be provided.

7.8.3. Availability Test

After site performance test, a 1000-hour availability test shall be conducted on all supplied systems in an integrated and simultaneous manner under normal day-to-day operating conditions. The test shall verify the reliability and integrity of the database, displays, report and all communication interfaces and, under these conditions, verify system availability for 99.9%. Further each server and device if applicable shall meet a minimum availability of 98% individually. In case of field devices, if applicable, downtime of individual such devices are to be excluded from system availability

calculations, however, minimum 50% of field devices shall be reporting for test to continue. In the event of repeated (not more than 3) unsuccessful re-runs of the availability test; Employer/Owner shall invoke the default provisions.

7.8.3.1. Test Responsibilities

Employer/Owner will be responsible for conducting the availability test. The test shall consist of normal UNMS operations without special test equipment or procedures. Test records defined in the availability test plan and procedures will be maintained by Employer/Owner personnel. Employer/Owner will operate and maintain the system according to procedures described in the approved Contractor documentation. UNMS maintenance on an on-call basis shall be provided by the Contractor during the availability test period. When on-site maintenance support is needed, qualified Contractor personnel shall arrive at the site within maximum four (4) hours of notification and shall keep employer/Owner fully informed of the progress in problem resolution. For availability purposes, this service response time and the associated on-site maintenance time shall be taken into account as defined in as per relevant section of the specification.

The contractor shall maintain an inventory of spare parts, which may be required to achieve the specified availability. These spares shall be in addition to the mandatory spares. All spare parts used during the availability test shall be drawn from contractor's inventory. During the availability test period, Employer/Owner reserves the right to modify the databases, displays, reports, and application software. Such modifications will be described to the Contractor at least 48 hours in advance of implementation to allow their impact on the availability test to be assessed, except where such changes are necessary to maintain control of the power system.

7.8.3.2. Downtime

Downtime occurs whenever the criteria for successful operation defined in as per relevant section of technical specification are not satisfied. Downtime shall be measured from the start of diagnostic procedures until full service is restored. In the event of multiple failures, the total elapsed time for repair of all problems (regardless of the number of maintenance personnel available) shall be counted as downtime. For on-site response the delay in response time (more than four hours) shall be added to down time.

7.8.3.3. Hold-time

During the availability test, certain contingencies may occur that are beyond the control of either Employer/Owner or the Contractor. These contingencies may prevent successful operation of the system, but are not necessarily valid for the purpose of measuring system availability. Such periods of unsuccessful operation may be declared "hold-time" by mutual agreement of Employer/Owner and the Contractor. Specific instances of hold-time contingencies are:

- a) **Scheduled Shutdown:** During scheduled shutdowns, or if an equipment failure occurs while its backup device is scheduled out-of-service, the resulting system outage shall be hold-time, provided that service can be restored according to Contractor-specified procedures within 30 minutes.
- b) **Power Interruption and Environmental Excursion:** Loss of power or manual shutdown in the event of loss of environmental control shall be considered hold-time. If the system is operated during periods of power or environmental conditions beyond those specified, any resultant downtime shall also be considered hold-time.
- c) **Intermittent Failure:** Periods during which an intermittent, recurring software or hardware failure is experienced will be considered holdtime, provided that the Contractor is engaged in remedial action and normal functions can be restored by Contractor-defined procedures whenever the failure occurs. Instead of accounting for the actual intermittent downtime, one hour of downtime shall be counted for each 120 hours of otherwise successful operation while the problem persists.
- d) **Failure of Employer/Owner's Software:** Time during which the system is down due to failure of software written and independently produced by Employer/Owner shall be considered hold-time. If a failure in such software cannot be overcome by Contractor-defined procedures, execution of the failed program will be suspended. Programs developed by Employer/Owner personnel under Contractor supervision are specifically excluded from this provision.
- e) **Service Response Time:** A maximum four (4) hours of hold time will be allowed for the Contractor to respond to each call for maintenance support. The time between detection of a failure and the start of diagnostic procedures shall also be considered hold-time when performed by Employer/Owner's personnel.
- f) **Corrected Design Defect:** Hold-time may be declared by mutual agreement to ensure against similar future occurrences if a failure occurs due to a defect in system design for which the Contractor defines and implements corrective measures. In such a case, holdtime shall be allowed in increments of 120 hours to allow verification of the corrective action.

7.8.3.4. Test Duration and Criteria for Acceptance

After the elapse of 1000 hours of cumulative test time, the availability shall be calculated considering the downtime recorded. Should availability falls short of specified percentage, the contractor may either (a) Continue the test by moving the starting time of the test forward and continuing the test until the consecutive hours have been accumulated and the specified availability has been achieved subject to maximum of 75 days, Or (b) the contractor may restart the test for 1000 hours, however, more than two such restart shall not be allowed.

To establish that all failures have been satisfactorily repaired prior to the end of the availability test, no downtime, intermittent (hold time) failures, or more than one un-commanded fail over shall have occurred within 240 hours of the test's conclusion. In the event of repeated unsuccessful reruns of the availability test, Employer/Owner may invoke the default provisions described in Volume I of the Specification. The successful completion of the availability test will lead to Operational Acceptance of the system.

7.8.3.5. Criteria for successful operation

The system shall be designed to meet the total system availability of 99.9%. That is, the ratio of total operational time minus downtime to total operational time shall be equal to or greater than 0.999. Total operational time shall not include the hold time. Further each server and device shall meet a minimum availability of 98% individually.

7.8.4. Contractor's Maintenance Responsibility till Operational Acceptance

During this period, the Contractor shall make available resident Project Manager, hardware & software specialists, who shall be available upon notification by the Employer /Owner about any problem(s) that may exist. The contractor's specialists shall be required to respond to the Employer/Owner's notification in line with the provisions of technical specifications. The contractor shall replace or repair all defective parts and shall have prime responsibility for keeping the system operational.

-----**End of the Section**-----

VOLUME II PART-C

AUXILIARY POWER SUPPLY SYSTEM

CONTENTS

VOLUME II PART-C: AUXILIARY POWER SUPPLY SYSTEM

In order to provide reliable power supply to UNMS center equipment, a UPS and other auxiliary equipment's is to be provided as a part of UNMS System. This Volume-II, Part (C) of the specification describes the technical requirement of UPS, Battery, ACDB and associated items for Auxiliary Power Supply system.

SECTIONS

SECTION 1	AUXILIARY POWER SUPPLY SYSTEM (APS)

PART- C SECTION-1

AUXILIARY POWER SUPPLY SYSTEM (APS)

PART- C SECTION-1

AUXILIARY POWER SUPPLY SYSTEM (APS)

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PART- C SECTION-1

AUXILIARY POWER SUPPLY SYSTEM (APS)

This section describes the requirements for Auxiliary Power Supply system to be provided for the project as follows to be provided by the Contractor.

1.1 General Information and Scope

This section describes the requirements for Auxiliary Power Supply system to be provided for the project as follows to be provided by the Contractor.

Scope will be same as mentioned in previous section of Technical specification

1.2 Uninterruptible Power Supply (UPS) Requirements

1.2.1 UPS Functions

The UPS shall be a continuous-duty, on-line, solid-state power supply system designed to provide power conditioning and uninterrupted power supply to the loads. The critical loads to be served by the UPS include the Computer System of UNMS centre including system computers, emergency lighting, and other critical loads at UNMS centre necessary to sustain the operation.

The two UPS systems shall normally be running in parallel mode; however, it shall be possible to run each UPS in independent mode. The contractor shall provide the necessary hardware and software including cabling & interfaces required for the parallel operation. Each UPS system shall consist of various sub-systems such as rectifier/charger, batteries, solid state Pulse Width Modulation (PWM) based inverter, static bypass switch, manual maintenance bypass switch, load transformer, panels, cables and accessories etc. as required in accordance with this Specification. The facilities shall also be provided to manually control the UPS through its control panel.

In the event of a loss of Input primary AC source, the UPS system shall provide power to the critical loads from the output of the inverter subsystems through batteries uninterruptedly.

1.2.2 UPS Configuration

A conceptual auxiliary power supply system configuration indicating the UPS systems running in parallel is given in Figure 2-1.

The UPS primarily uses the inverter subsystem to deliver AC power to the critical loads. In case of UPS failure the Static Bypass provides an alternate path to ensure continuous AC power supply to critical loads. Further, a manual maintenance bypass switch is also to be provided for maintenance of the UPS.

Each UPS system provided by the contractor shall include the following main equipment as well as all other components necessary for complete and proper operation of the UPS:

- a. Rectifier/charger unit
- b. Inverter
- c. Low Voltage disconnect feature to disconnect Battery bank
- d. Static bypass switch
- e. Manual maintenance bypass switch
- f. Load transformer and required filters
- g. Control panel, automatic controls and protection
- h. All necessary cables, MCCBs / MCBs / switches / fuses and other support hardware.

1.2.3 UPS Operation

The UPS shall provide continuous regulated sine wave AC power to the critical loads. As indicated in the Fig. 2-1, the two UPS systems shall be running in parallel configuration where each UPS system shall supply half of the critical loads through the AC distribution board. In the event of failure/outage, of one of the UPS systems, all the connected critical loads will be continued to be supplied through the healthy UPS without any interruption or distortion. In the event of failure/outage, of both the UPS systems, all the connected critical loads will continue to be supplied through the static bypass switch without any interruption. Further, it shall be possible to run both UPS in independent mode. It shall be possible to isolate/disconnect one of the UPS for maintenance without any interruption to the connected load.

The rectifiers/chargers shall provide voltage regulated DC power to the inverters while also charging and maintaining the batteries at full capacity. The inverters shall normally operate in synchronism with the mains AC power source. Upon loss of the mains AC power source or its frequency deviating beyond a preset range, the inverters shall revert to their own internal frequency standard i.e. free running mode. When the mains AC source returns to normal, the inverters shall return to synchronized operation with the mains AC source. Such reversal of operation of inverters from synchronous to free running mode and vice-versa shall not introduce any distortion or interruption to the connected loads. A suitable settable dead band for frequency may be provided to avoid unnecessary frequent reversal of inverter operation between free running mode and synchronised mode under fluctuating frequency conditions.

The control of the UPS system shall be based on microprocessor technology providing monitoring and control of rectifier/charger, Inverter, static switches, firing and logic control.

1.2.4 UPS equipment design features

The output rating of each UPS system shall be as per BOQ. The design of the UPS shall have the capability to isolate any failed piece of equipment viz. Rectifier/charger unit, inverter and battery for maintenance. UPS equipment design shall consider the following electrical parameters:

- UPS equipment shall comply with IEC 62040 or equivalent EN/BS standards for design, performance and EMC requirements.
- The input mains AC supply to the UPS shall be 415 volt AC, 3-phase, 4-wire, 50 Hz. The

input supply voltage may vary +10% to -15% from nominal and the frequency may vary from 47.5 to 52.5 Hertz.

- The UPS shall be suitable for operation on Mains input AC on phase sequence reversal (If this feature is not supported by UPS then suitable phase sequence corrector device shall be supplied).
- The UPS shall provide 3-phase, four wire output plus ground.
- The UPS shall supply power to the connected loads at 415 volt AC, 3-phase, 50 Hz at unity power factor and at 0.8-lagging power factor.
- The UPS shall provide continuous regulated sine wave AC power to the connected loads.
- The overall efficiency of the UPS, input to output, shall be a minimum of 90% with the batteries fully charged and operating at full load and unity power factor.

The requirements of each sub-system of UPS are detailed below:

1.2.4.1 Rectifier/Charger Unit

Each rectifier/charger unit output voltage shall be regulated to match the characteristics of the connected-supplied batteries and inverter. The output shall be current limited to protect the rectifier/charger unit circuitry and to prevent the batteries from over-charging.

The rectifier/charger unit shall be installed in a single enclosure along with the UPS system electronics. The rectifier/charger units shall have the following characteristics:

- (a) Input capacity, voltage, and frequency as stated in technical Specification.
- (b) Input current limit of 125 percent of the nominal full load input current.
- (c) Maximum input current distortion of 5 percent RMS total harmonic distortion (THD) at nominal input voltage and under full load.
- (d) Capacity to recharge the batteries to 90% State of Charge from fully discharged state (i.e. ECV of 1.75 V) within 10 hrs while carrying full load where battery charging current shall be considered as at least 20% of Battery AH capacity.
- (e) Temperature dependent battery charging with temperature sensing probes mounted on the battery banks.
- (f) Automatic float cum boost charging feature.

1.2.4.2 Inverter

Each inverter shall supply the critical loads at the rated frequency as per clause 1.2.4 above. The inverters shall have the following characteristics:

- (a) The nominal output voltage shall be as defined in clause 2.4, ± 1 percent at any load level.
- (b) The transient voltage response shall not exceed ± 4 percent for the first half-cycle recovering to ± 1 percent within ten cycles for a 100 percent step load application or removal.

- (c) The free running frequency shall not deviate by more than ± 0.1 percent for the rated frequency of 50 Hz.
- (d) The inverters shall be synchronized to the main AC source unless that source deviates from 50 Hz by more than ± 1 percent (adjustable to 1/2/3/4/5 percent).
- (e) The output voltage harmonic distortion shall not exceed 5 percent RMS and no single harmonic component shall exceed 3 percent.
- (f) The inverters shall be capable of operation at at-least 80 percent of the nominal capacity at the rated power factor and be capable of operation with loads ranging from the rated power factor through unity power factor. Inverter shall be suitable to accept 100% load at crest factor of at least 3:1 for Switching Mode Power Supply (SMPS) of computer system equipments without derating.
- (g) The inverters shall provide protection logic to automatically shut down and isolate from the load when the battery voltage drops below a preset voltage.
- (h) The inverters shall provide interrupter switch to isolate the unit from the load on failure of the inverter unit. The interrupter switch shall be rated to carry full continuous load and to interrupt the inverter under full fault load conditions.
- (i) The inverters shall be capable of supporting a start up surge or overload of 150 percent of rated output for up to 60 seconds.
- (j) The inverter shall include two winding / phase load transformer of one to one ratio with electrostatic shielding. This load transformer can be either internal or external to UPS panel.

1.2.4.3 Static Bypass Switches

Each UPS system shall include static bypass switch to facilitate automatic transfer of critical loads from the inverter sub-system output to bypass AC source and vice-versa under the following conditions:

- (a) The load capacity of both the inverter is exceeded
- (b) An over- or under-voltage condition exists on the inverter output
- (c) Inverters of both the UPS fails

The bypass switches shall be static, high speed devices rated to transfer and carry full rated load continuously. The static bypass switches shall provide protection to prevent out of phase transfers. The switching speed of the static bypass switches shall be less than 1 millisecond. During the changeover, the output voltage should not fall below 205V A.C., 50Hz $\pm 5\%$, in order to avoid any disruption to computer load supply. An automatic transfer back to the inverter subsystems shall occur if the transfer from the inverter subsystems was caused by a temporary overload and the load has returned to normal or by a temporary over/under voltage condition on inverters output and the voltage has returned to normal.

Transfer back to the inverter subsystems, both automatic and manual, shall be inhibited under the following conditions:

- (a) The frequency of bypass AC source is outside the specified frequency band.
- (b) The inverters output voltage and frequency are beyond the preset range.
- (c) An overload exists.

1.2.4.4 Manual maintenance bypass switch

Each UPS system shall include manual maintenance bypass switch to facilitate transfer of the critical load from the UPS output to the raw AC mains source. This switch shall be rated to transfer and carry continuous full rated load and shall be provided with suitable protection to avoid inadvertent closing of this switch when UPS is running either in normal mode or in static bypass switch mode. This switch is primarily provided to facilitate maintenance of the UPS system.

1.2.4.5 Battery requirement for UPS

Each UPS system shall have a set of storage batteries designed for continuous UPS application. The batteries shall be maintenance free VRLA type Batteries. The detailed requirements of battery are specified in technical specification.

1.2.4.6 Battery Breaker for UPS system

A 2-pole MCCB of suitable rating shall be provided near the battery bank (at suitable location on the frame of the battery bank) to allow disconnection of the batteries from the rectifier/charger unit and inverter. This shall also provide over-current protection to the batteries.

1.2.4.7 UPS Control/Monitoring

The Contractor shall supply control panel to permit automatic & manual operation, monitoring, manual control, and indication of alarms pertaining to the UPS operation through local man machine interface (MMI).

The Contractor shall also supply a Work Station for remote monitoring of both the UPS systems including all alarms, status and analog values of each UPS along with Battery. The minimum hardware configuration of workstation shall be:

- (a) RAM- 8 GB,
- (b) Hard Disk: 500 GB,
- (c) Monitor: 24” colour monitor.
- (d) DVD RW drive,
- (e) 1 Gbps dual Ethernet ports,
- (f) Mouse & Keyboard,
- (g) Two external speakers

This workstation shall be placed in the control room. The Contractor shall supply the /necessary furniture for the above workstation. In this regard, the Contractor shall supply & commission all

required hardware & software including interconnecting cables, interfaces etc.

1.2.4.8 Controls

UPS manual controls shall include the following:

- (a) DC under-voltage shutdown setting
- (b) UPS NORMAL/BYPASS/MAINTENANCE/OFF control
- (c) UPS Parallel or independent mode of operation selection control
- (d) Adjustment of frequency of inverter for synchronisation with input mains.

1.2.4.9 Display

In each UPS system, a local display of the following operating status, alarm indications, analog measurements and potential free contacts for wiring to remote alarms shall be provided:

Analog measurements:

- AC input voltage
- AC output voltage
- AC output current
- AC output frequency
- DC voltage of battery
- DC current of battery

UPS operating status:

- UPS on inverter mode / static bypass
- Load on Battery

Alarm conditions:

- Input mains fail
- Input supply phase sequence reversal
(if rectifier/charger is blocked)
- UPS fail
- Overload
- Battery Low voltage
- Battery path open

Potential free contacts:

- Input mains fail alarm
- Battery low voltage alarm

These potential free contacts shall be wired to Output ACDB panel.

Accuracy class of each analog and digital instrument shall be 1.0 or better except for frequency display, which shall be at-least 0.5. Frequency meters display shall be in the digital form. All

indicating instruments shall be flush mounted on panel front. The covers and cases of instruments and meters shall provide a dust and vermin proof construction. All instruments shall be compensated for temperature errors and factory calibrated to directly read the primary quantities. Means shall be provided for zero adjustment without removing or dismantling the instruments. Composite meter or LCD display to indicate more than one analog quantity is also acceptable.

1.2.5 Automatic orderly shutdown software

Suitable automatic orderly shutdown software shall be provided by the Contractor to shut down the computer systems connected to UPS, in case of UPS problems such as Low Battery voltage and low remaining Battery autonomy time. These computers may have different operating systems such as Windows, Linux etc. The automatic orderly shutdown of all the computers (at least 30) including servers, workstation consoles & PCs shall be required. This software shall take into consideration the parallel configuration of the UPS. Each UPS shall have SNMP card suitable for connection to the Ethernet LAN of the computer systems. The Contractor shall supply all required hardware & software including interconnecting cables/interfaces hardware as required for their design. The Contractor shall also provide support for the installation of this software in different computers apart from installing these in the UNMS system computers being supplied under this contract.

1.2.6 Input/output Switches for UPS system

The input /output switches shall be provided as indicated in Fig. 2-1. The input supply to the UPS shall be provided from Input ACDB/LT panel as indicated in Fig. 2-1. Further, a suitably rated output switch shall also be provided to allow disconnection of the inverter subsystem output from the load of the UPS.

1.2.7 Noise Level

Noise generated by the UPS under normal operating condition shall not exceed 78 dB measured five (5) feet from the front of the cabinet surface.

1.2.8 Environmental Conditions

The UPS shall be capable of continuous operation without failures in the following environmental conditions:

- (a) Temperature - Ambient temperature of 0⁰ to 50⁰C, and
- (b) Humidity - 5 to 95%, non-condensing.

In case the above environmental conditions are not fulfilling by the rated UPS then higher rating UPS shall be supplied.

1.2.9 Enclosures/ Earthing

The UPS electronic equipment and associated circuitry shall be housed in free standing enclosures. Modules and subassemblies shall be easily replaceable and maintainable with front access only. The enclosures shall be painted inside and outside. Cable entry shall be from the

top/bottom of the enclosures and shall be finalized during detailed engineering. The enclosures shall not have doors that are wider than 80 cm and doors shall be hinged with locking. Keyed locking is required with identical keys for all enclosures. The enclosures shall not exceed 220 cm in height. The applicable degree of protection of enclosures shall be IP20. However, the top of the cubicle shall be fully covered to avoid ingress of any water from top.

Each enclosure or enclosure group shall include safety earth networks within the enclosure. The safety earth network shall terminate at two/more studs for connecting with the existing earth mat. Each earth network shall be a dedicated copper bus bar, braid, or cable. Use of the enclosure frame, skins, or chassis mounting hardware for the earth network is not acceptable. The Contractor shall be responsible for proper grounding of UPS system & all associated equipments. The Contractor shall provide earthing inside the panels, between the panels and to the Employer/Owner provided nearest available earthing grid/raiser, including any other special earthing, if required. The connection to the nearest available earthing grid shall be made by the Contractor through 50X6 sq. mm. GI strip with proper protection.

1.2.10 Cable Connections

All internal cables and wires shall be of stranded copper conductor, sized according to their current requirements with minimum insulation rating of 1100 VAC. Extra-flexible wire shall be used for all circuits mounted on door or swing panels within the UPS. All connections between the Contractor supplied equipment and Employer/ Owner-supplied power and critical loads shall be through breakers supplied by the Contractor. These breakers shall permit power connections using compression or crush type terminals rated in accordance with each connection. All terminals shall be clearly labelled. The Contractor shall provide drawings showing the type and construction of the field wiring terminations as well as mounting and breaker characteristics.

1.2.11 Availability

The UPS shall be designed for a minimum availability of 99.9 percent. Availability of the UPS shall be defined as:

$$\% \text{Availability} = (1 - (\text{downtime} / \text{total operating time})) * 100$$

1.2.12 Maintainability

The UPS shall be designed to permit rapid isolation and repair/replacement of all hardware failures. The design shall facilitate easy access and identification of all electronic modules and maintenance points.

1.2.13 Testing requirements

The Contractor shall submit, along with the bid, the UPS reports of type test conducted earlier (including performance, functional & EMI/EMC tests) on the same make & rating as offered as per IEC 62040 or equivalent EN/BS standards. The testing requirements are defined as per Table

2-1 below.

TABLE 2-1 LIST OF TESTS FOR UPS

Sl. No.	Test	Type Test*	FAT	SAT	Clause Ref. of IEC Std.
A. Performance & Functional tests: (Performance Tests as per IEC 62040-3, Table 3)					
1.	Control and monitoring signals	X			6.3.1
2.	UPS input tests				6.3.2,
	a) Steady state input voltage tolerance	X			6.3.2.1,
	b) Input frequency variation	X			6.3.2.2,
	c) Input Inrush current	X			6.3.3
3.	UPS Output characteristics- Static conditions				6.3.4,
	a) Output – Normal mode – No load	X			6.3.4.1,
	b) Output – Normal mode – Full load	X			6.3.4.2,
	c) Output – Stored energy mode – No load	X			6.3.4.3,
		X			6.3.4.4,
	d) Output – Stored energy mode – Full load	X			6.3.4.5,
		X			6.3.4.6,
	e) Output voltage unbalance test	X			6.3.5.1,
	f) DC components in the output	X			6.3.5.2,
	g) Output – Normal mode – Overload	X			6.3.5.3,
	h) Output – Stored energy mode – Overload	X			6.3.5.4,
		X			6.3.5.5,
	i) Output – Normal mode – Short circuit				
	j) Output – Stored energy mode –short circuit	X			6.3.5.6
	k) UPS rated output fault clearing capability – Normal mode				
	l) UPS rated output fault clearing capability – Stored energy mode				
4.	UPS output dynamic tests				6.3.6,
	a) Change of operating mode – Normal to stored energy – Linear load	X			6.3.6.1,
	b) Change of operating mode – Stored energy to normal – Linear load	X			6.3.6.2,
	c) Change of operating mode – Stored energy to normal mode	X			6.3.6.3,
	d) Change of operating mode – Normal	X			6.3.6.4,

Sl. No.	Test	Type Test*	FAT	SAT	Clause Ref. of IEC Std.
A. Performance & Functional tests: (Performance Tests as per IEC 62040-3, Table 3)					
	to bypass mode	X			
	e) UPS output load steps – linear load	X			6.3.7.1,
	f) Reference non-linear load output distortion – normal mode	X			6.3.8.1,
	g) Reference non-linear load output distortion – stored energy mode	X			6.3.8.2,
	h) Reference non-linear load change of operating mode	X			6.3.8.3,
	i) Reference non-linear load steps-normal mode	X			6.3.8.5
	j) Reference non-linear load steps- stored energy mode	X			6.3.8.6
5.	Stored energy and restored energy tests				6.3.9,
	a) Stored energy time	X	X [#]	X	6.3.9.1,
	b) Restored energy time	X	X [#]	X	6.3.9.2,
	c) Efficiency and input power factor	X			6.3.10
6.	Back feed tests	X			6.3.11
Functional Tests as per IEC 62040-3, Table 4 :					
7.	Interconnection Cable Check	X	X	X	6.6.1
8.	Light Load Test	X	X		6.6.3
9.	UPS Auxiliary Devices Test	X	X	X	6.6.4
10.	Synchronization Test	X			6.6.5
11.	A.C. input failure Test	X	X	X	6.6.6
12.	A.C. input return Test	X	X	X	6.6.7
13.	Simulation of parallel redundant UPS fault	X	X	X	6.6.8
14.	Transfer Test	X	X	X	6.6.9
15.	Full Load Test	X	X		6.6.10
16.	Current division in parallel or parallel redundant UPS test	X	X		6.6.14
17.	Battery ripple current test	X			6.6.17
18.	Output over voltage test	X			6.6.22
19.	Periodic output voltage variation test	X			6.6.23
20.	Harmonic Components test	X	X		6.6.26
21.	Earth Fault test	X			6.6.27
22.	On site ventilation test	X		X	6.6.28

Sl. No.	Test	Type Test*	FAT	SAT	Clause Ref. of IEC Std.
A. Performance & Functional tests: <i>(Performance Tests as per IEC 62040-3, Table 3)</i>					
23.	Audible noise test	X			7.3
24.	Standby generator compatibility test			X	6.6.29
25.	Parameter/Configuration settings	X	X	X	
26.	Co-ordination & Discrimination Tripping of associated Breakers (MCCB/MCBs) in upstream & downstream		X	X	

Sl. No.	Test	Type Test*	FAT	SAT	Clause Ref.
B. EMI /EMC Tests: <i>(Tests requirements as per IEC 62040-2)</i>					
1.	Immunity to electrostatic discharges (Requirement of level 3, performance criterion A)	X			3.2, Annex. D.2
2.	Immunity to radiated electromagnetic fields (Minimum requirement level 3, performance criterion A)	X			3.3, Annex. D.3
3.	Immunity to fast transients (Minimum requirement level 4, performance criterion A)	X			3.4, Annex. D.4
4.	Immunity to surges (As per IEC 61000-4-5, Level 4), performance criteria A	X			3.5, Annex. D.5
5.	Immunity to low-frequency signals (i) Power line harmonics and inter-harmonics (ii) Immunity to voltage dips	X			3.6, Annex. D.6, D.6.1, D.6.3
6.	Radio frequency interference and conducted noise test (Conducted & Radiated Emission)	X			Clause 2
Environmental tests: <i>(Tests requirements as per IEC 62040-3)</i>					
1	Environmental tests (for operating condition tests - under Normal operation of UPS) a) Dry heat test at 50 0C for 16 hrs	X			7.1 & 7.2

Sl. No.	Test	Type Test*	FAT	SAT	Clause Ref.
	b) Damp heat test at 40 0C + 20 C at humidity of 90% to 95% for 96 hrs c) Cold test at 00 C for 2 hrs Damp heat test repeat	X X X			
	NOTE: Besides above, the tests may also be conducted to verify the functional and other requirements as per specifications. *For Type Tests, only the test reports to be submitted along with the bid. # For UPS FAT, battery related tests shall be conducted on similar type or test batteries available in factory				

1.3 Battery Requirements

The Contractor shall supply Valve Regulated Lead Acid (VRLA) maintenance free Battery with each UPS. Each UPS battery set shall have sufficient capacity to maintain output at full rated load as indicated in BOQ. The battery shall be capable of being recharged to 90% State of Charge (SOC) from the fully discharged condition (1.75V/cell) within 10 hrs. In all cases, the battery is normally not allowed to discharge beyond 80% of rated capacity (80% DOD) at 10 hours rate of discharge.

The supplier, supplying the cells/batteries as per this document shall be responsible to replace/repair free of charge, the battery/cell becoming faulty, owing to defective workmanship or material as per the provisions of the bid document

1.3.1 Constructional Requirements

The design of battery shall be as per field proven practices. Partial plating of cells is not permitted. Paralleling of cells externally for enhancement of capacity is not permitted. Protective transparent front covers with each module shall be provided to prevent accidental contact with live module/electrical connections.

1.3.1.1 Containers

The container material shall have chemical and electro-chemical compatibility and shall be acid resistant. The material shall meet all the requirements of VRLA batteries and be consistent with the life of battery. The container shall be fire retardant and shall have an Oxygen Index of at least 28%. The porosity of the container shall be such as not to allow any gases to escape except from the regulation valve. The tensile strength of the material of the container shall be such as to handle the internal cell pressure of the cells in the worst working condition. Cell shall not show

any deformity or bulge on the sides under all working conditions. The container shall be capable of withstanding the rigours of transport, storage and handling. The containers shall be enclosed in a steel tray.

1.3.1.2 Cell Covers

The cell covers shall be made of suitable material compatible with the container material and permanently fixed with the container. It shall be capable to withstand internal pressure without bulging or cracking. It shall also be fire retardant. Fixing of Pressure Regulation Valve & terminal posts in the cover shall be such that the seepage of electrolyte, gas escapes and entry of electro-static spark are prevented.

1.3.1.3 Separators

The separators used in manufacturing of battery cells, shall be of glass mat or synthetic material having high acid absorption capability, resistant to battery acid and good insulating properties. The design of separators shall ensure that there is no misalignment during normal operation and handling.

1.3.1.4 Pressure Regulation Valve

Each cell shall be provided with a pressure regulation valve. The valve shall be self-re-sealable and flame retardant. The valve unit shall be such that it cannot be opened without a proper tool. The valve shall be capable to withstand the internal cell pressure specified by the manufacturer.

1.3.1.5 Terminal Posts

Both the +ve and –ve terminals of the cells shall be capable of proper termination and shall ensure its consistency with the life of the battery. The surface of the terminal post extending above the cell cover including bolt hole shall be coated with an acid resistant and corrosion retarding material. Terminal posts or any other metal part which is in contact with the electrolyte shall be made of the same alloy as that of the plates or of a proven material that does not have any harmful effect on cell performance. Both +ve and –ve posts shall be clearly and unambiguously identifiable.

1.3.1.6 Connectors, Nuts & Bolts, Heat Shrinkable Sleeves

Where it is not possible to bolt the cell terminals directly to assemble a battery, separate non-corroding lead or copper connectors of suitable size shall be provided to enable connection of the cells. Copper connections shall be suitably lead coated to withstand corrosion due to sulphuric acid at a very high rate of charge or discharge. Nuts and bolts for connecting the cells shall be made of copper, brass or stainless steel. Copper or brass nuts and bolts shall be effectively lead coated to prevent corrosion. Stainless steel bolts and nuts can be used without lead coating.

All inter cell connectors shall be protected with heat shrinkable silicon/PVC sleeves for reducing the environmental impact including a corrosive environment.

1.3.1.7 Flame Arrestors

Each cell shall be equipped with a Flame Arrestor to defuse the Hydrogen gas escaped during charge and discharge. Material of the flame arrestor shall not affect the performance of the cell.

1.3.1.8 Battery Bank Stand

All batteries shall be mounted in a suitable metallic stand/frame. The frame shall be properly painted with the acid resistant paint. The suitable insulation shall be provided between stand/frame and floor to avoid the grounding of the frame/stand.

1.3.2 Capacity Requirements

When the battery is discharged at 10 hour rate, it shall deliver 80% of C (rated capacity, corrected at 27°Celsius) before any of the cells in the battery bank reaches 1.85V/cell.

The battery shall be capable of being recharged from the fully exhausted condition (1.75V/cell) within 10 hrs. All the cells in a battery shall be designed for continuous float operation at the specified float voltage throughout the life. Float voltage of each cell in the string shall be within the average float voltage/cell $\pm 0.05V$ band.

The capacity (corrected at 27°Celsius) shall also not be less than C and not more than 120% of C before any cell in the battery bank reaches 1.75V/cell. The battery voltage shall not be less than the following values, when a fully charged battery is put to discharge at C/10 rate:

(a) After Six minutes of discharge	: 1.98V/cell
(b) After Six hours of discharge	: 1.92V/cell
(c) After 8 hours of discharge	: 1.85V/cell
(d) After 10 hours of discharge	: 1.75V/cell

Loss in capacity during storage at an average ambient temperature of 35° Celsius for a period of 6 months shall not be more than 60% and the cell/battery shall achieve 85% of its rated capacity within 3 charge/discharge cycles and full rated capacity within 5 cycles, after the storage period of 6 months. Voltage of each cell in the battery set shall be within $\pm 0.05V$ of the average voltage throughout the storage period. Ampere hour efficiency shall be better than 90% and watt hour efficiency shall be better than 80%.

1.3.3 Expected Battery Life

The battery shall be capable of giving more than 1200 charge/discharge cycles at 80% Depth of discharge (DOD) at an average temperature of 27° Celsius. DOD (Depth of Discharge) is defined as the ratio of the quantity of electricity (in Ampere-hour) removed from a cell or battery on discharge to its rated capacity. The battery set shall have a minimum expected operational life of 5 years at normal operating conditions or 1200 charge/discharge cycles (whichever is early).

To meet the above conditions, battery should be installed in Air conditioned environment.

1.3.4 Routine Maintenance of Battery system

For routine maintenance of battery system, the Contractor shall supply one set of following tools:

- Torque wrench.
- Tool for opening /closing of pressure regulation valve of battery.
- Hand held digital multimeter for measurement of resistance, AC/DC voltages.

1.3.5 Testing requirements

The Contractor shall submit type test reports for the battery for the same make, model & rating as offered as per the IEC 60896 or equivalent IS/EN/BS/TEC standards. In the event, the type test reports for exact rating is not available, the Contractor shall submit type test reports for higher rating Battery. The testing requirements are defined as per Table 3-1 below:

TABLE 3-1

LIST OF TESTS FOR VRLA BATTERY

Sl. No.	Test	Type Test*	FAT	SAT
1.	Verification of marking - Visual observation - Dimensional inspection - Polarity checking	X	X	X
2.	Capacity test	X	X	X
3.	Suitability for floating battery operation	X		
4.	Endurance in discharge/charge cycles	X		
5.	Charge Retention	X		
6.	Short-circuit current and internal resistance	X		
7.	Mechanical Tests -Vibration Test (procedure as per IEC 60068-2-6) - Free fall Test (procedure as per IEC 60068-2-32)	X X		

NOTE :

- 1 The batteries shall meet the general requirements as per IEC 60896 or equivalent standards.
- 2 **Only the type test reports to be submitted.*

1.4 AC Distribution Boards Requirements

The Contractor shall provide AC power distribution boards (ACDBs) as specified. The distribution boards shall distribute power to the Employer/ Owner equipment and provide protection against failures on feeder circuits. The scope for distribution boards includes supply, installation, wiring, cabling, and commissioning of all associated hardware as required for distribution of power. The Contractor shall supply and install MCCBs, Surge protection devices, cable and all associated items of adequate rating for providing input to the UPS .

There shall be AC Distribution Boards consisting of one no. 'Input ACDB' and one no. 'Output ACDB'. A conceptual configuration showing the components and arrangements is given in Figure 2.1. The size and characteristics of each MCCB, MCB & Surge Protection Devices (SPDs) shall be determined and provided as per the requirement of the scheme. The quantity of MCCBs, MCBs, Contactors & Surge Protection Devices (SPDs) shall be supplied as per Fig. 2-1.

The Contractor shall extend safety earth connections from Input ACDB panel & Output ACDB panel to nearest earth grid /riser or earth pit using either suitably sized Copper cable or through 50 X 6 sq. mm GI strips.

The requirement of AC distribution boards are as follows:

1.4.1 Input ACDB

The input ACDB shall have following characteristics:

- (a) The rating shall be of minimum as stated in relevant appendices of the technical specification.
- (b) It shall be provided with 4 nos. of Four (4) Pole type MCCBs which shall conform to IS 13947-2/IEC 60947-2 as indicated in figure 2-1. All the MCCBs shall provide over-current, short circuit protection and the co-ordination for the overload and short-circuit tripping of the MCCBs/MCBs with upstream and downstream switchgear shall be provided for the satisfactory discrimination.
- (c) It shall be provided with Class 'B' & 'C' type surge protection. The surge protection shall be in compliance with IEC 61312, IEC 61024, VDE 0100-534 or latest revision

for following surges:

(i) Low Voltage Surges (Class C):

Between	Requirement
R-N, Y-N, B-N	$I_n \geq 10\text{kA}$, 8/20 μS for each phase
N - PE	$I_n \geq 20\text{kA}$, 8/20 μS
I_n = Value of Nominal Discharge Current	

(ii) Lightning Electromagnetic impulse and other High surges (Class B):

Between	Requirement
R-N, Y-N, B -N	$I_{imp} \geq 50\text{kA}$, 10/350 μS for each phase
N - PE	$I_{imp} \geq 100\text{kA}$, 10/350 μS
I_{imp} = Value of Lightning Impulse Current	

The blind spots shall be avoided as per IEC 61312-3 or latest revision.

1.4.2 Output ACDB

- The Contractor shall provide Output ACDB panel for distribution of power to the computer system. The rating shall be of minimum as stated in relevant appendices of the technical specification. This distribution board shall be suitable for free-standing or wall mounted type. In this ACDB, total 30 numbers of feeders (10 numbers per phase) shall be provided. The type of distribution board whether free-standing or wall mounted type shall be finalized during detailed engineering.
- One number of 4-pole Bus section MCCB of requisite rating (Refer Fig. 2-1) shall be provided which shall be kept in normally closed (NC) condition when both UPS are running in parallel. This MCCB shall have suitable locking mechanism to avoid inadvertent opening while UPS are running in parallel.
- For distribution of power from the UPS output, MCBs (6 to 25 Amps) of Double Pole type as per quantity indicated in Fig. 2-1 shall be provided. The MCBs ratings shall be finalised based on the UNMS subsystem rating and for balance MCBs Vendor has to coordinate with Employer/ Owner. All MCBs shall be of Curve B current characteristics to have faster fault clearing time and shall conform to IEC-60898 and IS 8828.
- Output ACDB shall have indicating lamps for each phase & both section of bus charged indication.

- (e) 2 nos of Voltmeter with selector switch for all phases on section of each bus shall be provided.

Enclosures/Panels

The equipments of ACDB shall be physically mounted either in a free standing or in a wall mounted enclosure/panel as finalized during detailed engineering. The MCCB and sub-assemblies shall be easily replaceable and maintainable. Cable entry shall be from the bottom/top of the enclosures (to be finalized during detailed engineering). The Contractor shall state the type, size, and weight of all enclosures and indicate the proposed manner of installation. The applicable degree of protection of enclosures shall be at least IP21. Each ACDB and equipment within ACDB enclosures shall be clearly labelled to identify the enclosure/equipment

1.4.3 Testing Requirement

Equipment shall be factory tested before dispatch to site as per requirement of relevant section of this specification.

1.5 Cabling & Enclosure Requirements

The Contractor shall supply, install and commission all power cables, control cables, network interface cables and associated hardware (lugs, glands, cable termination boxes etc.) as required for all equipment. The Contractor shall be responsible for Cable laying and termination at both ends of the cable. The Contractor shall also be responsible for termination of feeder cables at Contractor's equipment end including supply of suitable lugs, glands, terminal blocks & if necessary cable termination boxes etc. All cabling, wiring, and interconnections shall be installed in accordance with the following requirements.

1.5.1 Power Cables

All external power cables shall be stranded Aluminium conductor, armoured XLPE/PVC insulated and sheathed, 1100V grade as per IS 1554 Part-I. The conductor for the Neutral connection from UPS to Output ACDB shall be sized 1.8 times the size of the Phase conductors to take care of the non-linear loads. However, the cable between UPS and Battery bank shall be of stranded copper conductor (armoured type).

1.5.2 Cable Identification

Each cable shall be identified at both ends which indicates the cable number, and the near-end and far-end destination. All power cables shall have appropriate colour for identification of each phase/neutral/ground. Cable marking and labelling shall comply with the requirements of the applicable standards:

1.5.3 Cable and Hardware Installation

The Contractor shall be responsible for supplying, installing, and terminating all cables and associated hardware (lugs, glands, etc.) required to mechanically and electrically complete the

installation of facilities for the project. Suitable mounting channel shall be provided for each panel as per site requirements.

1.5.4 Enclosures/Panels design

Enclosures/panel shall be of free standing type of design, unless otherwise specified. Cable entry shall be from the bottom/top of the enclosures (to be finalized during detailed engineering). The panel shall not have doors that are wider than 80 cm and doors shall be hinged with locking as per standard design of the manufacturer. Keyed locking is required with identical keys for all panels. The thickness of the structural frames and load bearing members shall be minimum 2.0 mm and for others shall be minimum 1.5 mm. The panels/boards shall be equipped with necessary cable gland plates.

Wiring within panel shall be neatly arranged and securely fastened to the enclosure by non-conductive fasteners. Wiring between all stationary and moveable components, such as wiring across hinges or to components mounted on extension slides, shall allow for full movement of the component without binding or chafing of the wire. Conductors in multi conductor cables shall be individually colour coded, and numbered at both ends within enclosures.

The enclosures shall be painted inside and outside. The finish colour of all enclosures shall be an aesthetically pleasing and shall be approved by the Employer/ Owner. Further, finish colour of external surfaces shall be preferably of same colour for all enclosures/panels.

Maintenance access to the hardware and wiring shall be through lockable, full height, from doors.

Each panel shall be supplied with 240 Vac, 50Hz single phase sockets with switch and door controlled fluorescent light of suitable size. All labelling shall be consistent with Contractor-supplied drawings.

1.5.5 Enclosure/Panel Earthing

Each enclosure shall include suitable earth networks within the enclosure. Earth network shall be a copper bus bar, braid or cable inside enclosures.

The safety earth network shall terminate at two/more studs for connecting with the earthing grid. Safety earthing cables between equipment and enclosure grounding bus bars shall be minimum size 6 mm², stranded copper conductors, rated at 300 volts. All hinged doors shall be earthed through flexible earthing braid.

For all enclosures requiring AC input power, the green earthing wire from the AC input shall be wired to the safety earthing stud. The Contractor shall provide all required cabling between enclosures for earthing. The Contractor shall connect safety and signal earths (as applicable) of each enclosure to the Employer/ Owner provided nearest earth grid/earth riser through suitable 50X6 sq. mm. GI strips or suitably sized copper cable.

The signal earthing network shall terminate at a separate stud connection, isolated from safety ground. The stud connection shall be sized for an external earthing cable equipped with a suitable lug.

All earthing connections to equipment shall be made directly to each equipment chassis via earthing lug and star washer. Use of the enclosure frame, skins, or chassis mounting hardware for the earthing network is not acceptable.

1.6 Inspection & Testing

General inspection & testing requirements specified at section 7 Part B shall be applicable for APS equipment also.

1.6.1 Factory Test

1.6.1.1 Factory Test for Battery, ACDB & associated Equipments:-

A factory test shall be conducted on all the offered Equipments (UPS, Battery, ACDB & associated Equipments) and shall include, but not be limited to the following, appropriate to the equipment being tested:

- (a) Verification of all functional characteristics and requirements specified
- (b) Voltage drop and transients generated during switching operations
- (c) UPS System efficiency tests
- (d) Inspection and verification of all construction, wiring, labelling, documentation and completeness of the hardware

Before the start of factory testing, the Contractor shall verify that all changes applicable to the equipment have been implemented. As a part of the factory tests, unstructured testing shall be performed to allow Employer/ Owner representatives to verify proper operation of the equipment under conditions not specifically tested in the above structured performance test. A minimum of 10 hours of the factory test period shall be reserved for unstructured testing. The Contractor's test representative shall be present and the Contractor's technical staff members shall be available for consultation with Employer/ Owner personnel during unstructured test periods. All special test facilities used during the structured performance test shall be made available for Employer/ Owner's use during unstructured testing. In addition to above, a list of factory tests specified at the end of the respective sections of these Equipments shall also be performed.

1.6.2 Field Performance Test

After the equipment has been installed, the Contractor shall start up and check the performance of the equipment of field locations. All hardware shall be aligned and adjusted, interfaces to all

inputs and outputs installed, operation verified, and all test readings recorded in accordance with the Contractor's recommended procedures. The field performance test shall exhibit all functions of the equipment and duplicate factory test. All variances must be corrected prior to the start of the field performance test. In addition to above, a list of site tests for UPS & Battery is specified at the end of the respective sections of these equipments.

1.6.3 Availability Test

Availability Test shall be carried out for 15 days. During the test the APS system shall be used as required to be used for day-to-day operation of the UNMS Centre Computer System including UNMS system. In case of any failure or mal-operation during this period the Contractor shall take all necessary action to rectify the problems. APS system shall be accepted by the Employer/Owner only after rectification of the problem in a mutually acceptable manner.

1.6.3.1 Testing Requirements

The requirements for type tests, factory acceptance tests and field acceptance testing have been specified under the respective clauses. After completion of field acceptance testing the auxiliary power supply system shall be put under availability test for fifteen (15) days. Availability test shall be carried out by the employer/owner. During the availability test the APS shall be used as required to be used for rest of the life. In case of any failure or mal-operation during this period the Contractor shall take all necessary action to rectify the problems. The APS shall be accepted only after rectification of the problems by the Contractor in a manner acceptable to the Employer/Owner.

1.6.4 Technical Support

Technical support shall be provided by the Contractor through final acceptance of the facilities by Employer/ Owner. This support shall be available on-site, when deemed necessary by Employer/ Owner. The Contractor remains solely responsible for correction of variances and other problems.

1.6.5 Maintenance of Equipment

The Contractor shall be responsible for the maintenance of the equipment until successful completion of field installation tests, the spares required for the same shall be provided by the Contractor. All maintenance performed by the Contractor, sub-Contractors, or OEMs shall be in accordance with procedures and schedules recommended by the equipment OEMs.

Equipment maintenance activities by the Contractor shall be recorded in an equipment maintenance log. Corrective and preventative maintenance entries in the equipment maintenance log shall include the following information:

- (a) Identification of the item being maintained, repaired, replaced, or upgraded
- (b) Name of the person who performed the repair

- (c) List of the maintenance procedures performed
- (d) Date and time when the malfunction was detected
- (e) Description of the malfunction or of any problems encountered
- (f) Date and time when the malfunction was corrected
- (g) Description of the corrective action taken.

Logs shall be available for Employer/ Owner inspection at all times and shall be delivered to Employer/ Owner when field performance tests are completed.

1.6.6 Mandatory Spares

List of mandatory spares for UPS are enclosed at BOQ.

1.6.7 Data Requirement Sheets

Data requirement sheets (DRS) for UPS, Battery & ACDB as per relevant appendices of the Technical Specification. These will be duly filled in by the Contractor & submitted along with the bid. During detailed engineering, Contractor will be required to submit detailed DRS to include all technical parameters of the equipment to ensure that the offered equipment meets all the technical specification requirements.

1.6.8 Documentation

The following specific document for items covered under this section shall be submitted which shall be in addition to the applicable general document.

- Data Requirement Sheets (DRS)
- Cable sizing calculations
- Inventory of the hardware
- Panel General arrangement drawing
- Panel Internal General Arrangement drawing indicating modules, major devices/components location etc.
- Installation drawings
- Schematic drawings
- Type Test reports
- FAT plan & procedure
- SAT plan & procedure
- External cable laying & termination schedule details
- Availability test plan & procedure

1.7 Maintenance

Scope of work consists of Comprehensive Preventive and break down maintenance of auxiliary

power supply equipment comprising of UPS systems including batteries supplied under the contract during one year warranty period and five year maintenance period thereafter.

1.7.1 Time Schedule

Efficient, reliable, responsive and effective services with minimum RT and TAT shall be the essence of the maintenance services to ensure the correct working order of auxiliary power supply equipment. RT is response time when Contractor's person report at site after reporting of fault in system. TAT is Turn-around-time when system is brought back in service after necessary rectification/replacement works. Time zero (For RT) starts after logging the complaint with the Contractor before 2 PM. After 2 PM, time zero starts at 9.00 AM of the next day. TAT starts after access is given to the Contractor for working on the faulty equipment.

1.7.2 Scope of work

The scope of maintenance services to be provided by the Contractor will include but will not be limited to the following:

- (a) Contractor shall provide maintenance services to maintain the auxiliary power supply equipment. Contractor shall make necessary tie up so that services of repair of card & equipment are available within specified time (Response time & turnaround time specified for site) to ensure healthiness of individual equipment and system as a whole. After making the system healthy, the defective part if not replenished/replaced immediately, shall be replenished /replaced within 15 Days at site.
- (b) Contractor shall document the maintenance activities to be carried out and shall establish a maintenance record for the performance of their duties and location wise history record of the equipment for future reference.
- (c) Monthly and quarterly report of routine and breakdown maintenance will be forwarded to Employer/ Owner coordinator for review & comments. The report should be submitted so as to reach Employer/ Owner office by 7th day of every month.
- (d) Contractor shall repair/replace faulty cards/modules or equipment identified during the maintenance within fifteen (15) days.
- (e) Contractor's services must be available on phone or fax round the clock on all working days/holidays for fault reporting and corrective actions. Emergency calls will be attended with utmost priority keeping aside any protocol and obligations.
- (f) Contractor shall use his own testing instruments/ tools/ any other item required for maintenance of equipment. If any special testing equipment/s is/are required for testing and repair of the system, same shall be arranged by the Contractor.
- (g) Contractor will take all due necessary safety precautions for proper safety of man & machine while carrying out the work at site. Contractor will also be required to take necessary accidental insurance cover (workman compensation policy) for the personnel deputed for the work covered under this contract as per prevailing law or laws. Employer/ Owner shall have no responsibility whatsoever for claims arising out of negligence/accident or any other reason for the personnel employed by the Contractor.

1.7.3 Employer's / Owner's Responsibility

- (a) Employer/ Owner shall nominate an Engineer I/C who shall be sole coordinator and interface between constituents and the Contractor.
- (b) Employer/ Owner shall arrange security passes/ permissions required by Contractors' maintenance engineers for all sites.
- (c) Employer/ Owner shall ensure free and unrestricted access to equipment sites during the maintenance period to the vendor's personnel and /or authorized personnel working on behalf of Contractor.
- (d) Employer/ Owner shall provide to the Contractor with the information on any planned expansion, alteration or relocation of the equipment that may have the impact on the system under maintenance.

1.7.4 Scope of Maintenance of Batteries & UPS

1.7.4.1 Preventive maintenance

This consists of measures regarded as necessary to maintain the equipment in the proper operating condition. Preventive maintenance includes functional checking, cleaning and necessary repair/replacements/adjustments etc. It will be carried out quarterly at mutually agreed dates. The following checks need to be carried out:

- a. Physical inspection of UPS and its accessories
- b. Cleaning of System
- c. Tightening of all the power and control connections
- d. Checking of output DC Voltage
- e. Checking of AC Voltage L-L, L-N
- f. Checking for batteries
- g. Checking for input AC current
- h. Checking of output AC Current
- i. Checking for any ripples
- j. Checking for output frequency
- k. Checking for transfer of UPS to Bypass and Bypass to UPS
- l. Checking for UPS transfer to batteries after shifting the main load on other UPS & on dummy load equivalent to actual battery load.
- m. Checking Of UPS for Normal Operation
- n. Checking of UPS PCB Parameters as per standard checklist of manufacturer.
- o. Checking for cooling fans, other indication meters installed on the panel.
- p. Checking earthing system by measuring earth to neutral potential.
- q. Checking of present load on UPS
- r. Matching of UPS parameters with monitoring system
- s. Proper guidance to operation staff for satisfactory working of the equipment and its proper upkeep.

Above observations shall be recorded as per Format-A duly signed by Employer/ Owner.

1.7.4.2 Break Down Maintenance

This is to be carried out in the event of malfunctioning of equipment, which prevents the operation of the power system. Break down maintenance includes fault finding, repair or replacement of defective parts modules/PCB/ switchgear/ components, functional checking, Analysis of the fault and plan for preventive measure to arrest recurrence of such faults, if any.

Immediately on noticing the fault, the fault will be reported by the Employer/ Owner on phone to the Contractor. The fault reporting time on phone shall be taken as reference time for the purpose of RT and TAT.

Format A: UPS/ACDB MAINTENANCE FORMAT

S.NO.	DESCRIPTION	VALUE,IF ANY	REMARKS
1	UPS & ACDB Cleaning has been done		
2	Power connections checked for tightness & over heating		
3	Control Connections are all tight		
4	All indications on the panel are working		
5	All cooling fans are working		
6	Checking for AC Voltage L-L, L-N		
7	Checking for input AC current		
8	Checking for Input frequency		
9	Checking of DC Voltage		
10	Checking AC output Current		
11	Checking for O/P frequency		
12	Rectifier LED		
13	Inverter Led		
14	Static Switch Led		
15	Normal Operation & link status as per manufacturer recommendations/performa		
16	Battery Current Limit		
17	Float voltage		
18	Invertor Voltage		
19	Invertor frequency		
20	Indication Bulbs Of ACDB		
21	Checking for transfer, of UPS to Bypass and bypass to UPS		
22	Checking for UPS transfer to batteries		
23	Checking of earthing		
24	Battery voltage, resistance/impedence measurement done & details enclosed		
25	Parameter checked in SCADA System		
26	Proper guidance given for normal day to day activities.		
27	Check functioning of hooter		

28 Remarks from Customer/Contractor :

Contractor's Representative

Employer Representative

-----**End of the Section**-----

VOLUME II

APPENDICES

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VOLUME II APPENDICES

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Appendix- A

Existing NMS Infrastructure of Western Region*						
NMS Location	NMS Details	No. of NMS	NMS Software	NBI Complaint	Equipment Type being Managed	Remarks
RHQ, Vadodara	Tejas	2	TJ5100	TMF 814	SDH	
	Valiant	1	VCL-NMS	Not applicable	PDH	
	FIBCOM	1	FIBCOM 6300NM3.6.08			
	ECI	2	EMS-APT		SDH	Out of 2 Nos of NMS 1 No installed at Jabalpur
	LOOP TELECOM	2			PDH	Out of 2 Nos of NMS 1 No installed at Jabalpur
	ABB	1				
RHQ, Nagpur	Tejas	1	TJ5100	TMF 814	SDH	
	FIBCOM	1	FIBCOM 6300NM3.6.08			
	ECI	1	EMS-APT			
	Valiant	1	VCL-NMS		PDH	
MPPTCL	TEJAS	1	TJ5100		SDH	
GETCO	GE	1	UCST-FOX 515		SDH	
CHATISGARH	ABB NMS SYSTEM	1			SDH	
	Total	16				

Note*: Above data is not exhaustive and further detail shall be aquired during detailed survey.

Appendix- A

Existing Total Network Element details of WR*

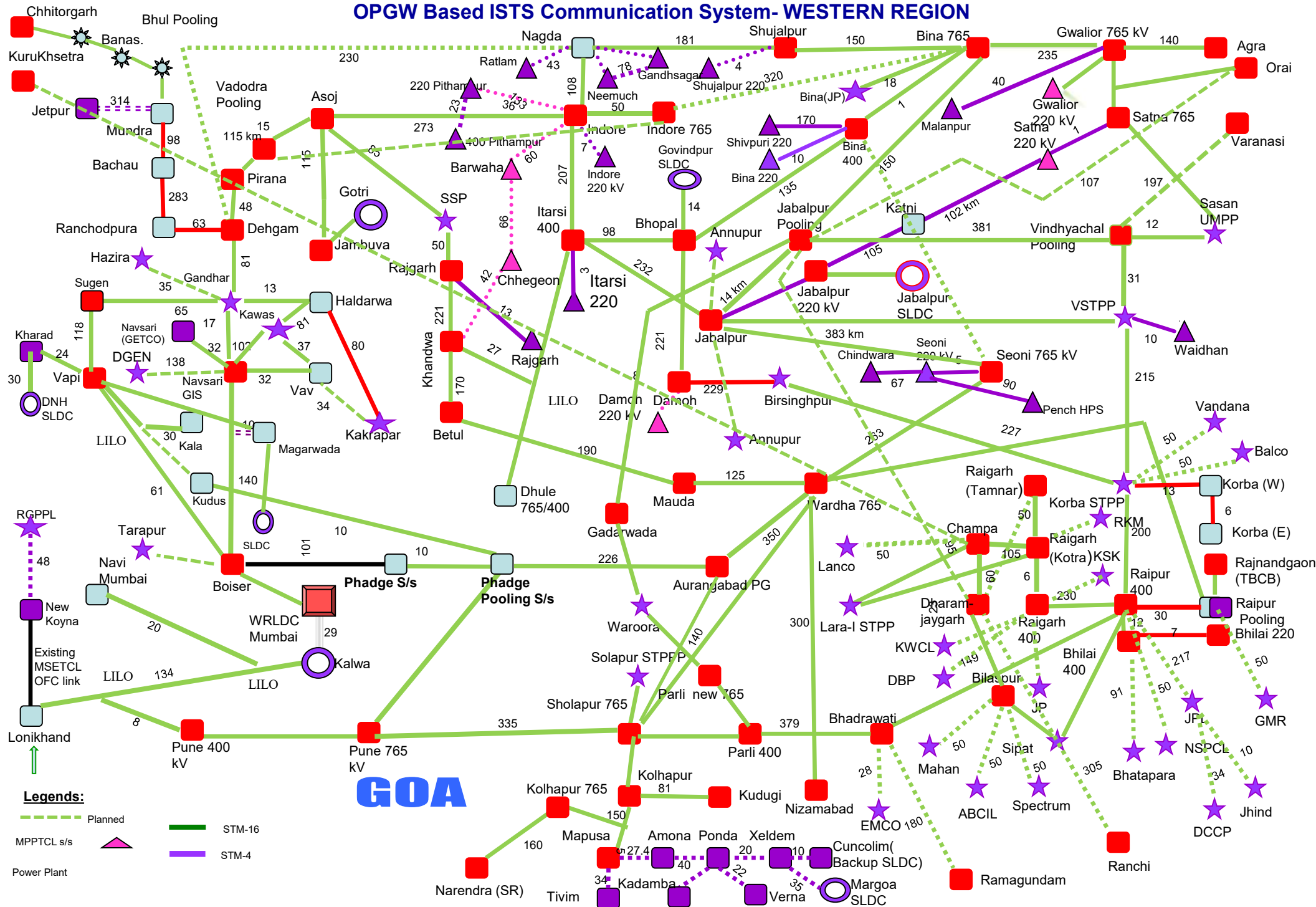
Constituent	Make	Type	No. of NE
MPPTCL	TEJAS	SDH	23
	FIBCOM	SDH	18
	Valiant MUX	PDH	87
DNH	FIBCOM	SDH	2
Daman and Diu	TEJAS	SDH	1
	FIBCOM	SDH	1
	ABB FOX VIEW	SDH & PDH	2
GETCO	GE	SDH	310
	ABB FOX VIEW	SDH & PDH	112
Central Sector	Tejas	SDH	90
	Valiant	PDH	100
	ABB	SDH	20
	ECI	SDH	25
	FIBCOM	SDH	38
	LOOP TELECOM	PDH	10
Maharashtra	TEJAS	SDH	55
	ABB FOX VIEW	SDH & PDH	74
	ECI	SDH	30
Chatisgarh	Tejas	SDH	7
	ABB	SDH	8
	VALIANT	PDH	6
GOA	FIBCOM	SDH	10
	Valiant	PDH	14
	ABB FOX VIEW	SDH & PDH	3
		Total	1019

Details of Upcoming/Future Node Elements and EMS/NMS*

Sr.No	EMS/ NMS type	Qty of EMS/NMS to be integrated	Number of Nes planned to be monitored through EMS/NMS	Availability of NBI (Northbound interface) in the upcoming EMS/NMS supporting all functionalities viz.Fault, inventory, Configuration, Performance ? (Yes/No)	Remarks
MPPTCL	SDH	2	483	Yes	
	PDH	2	483	Yes	
Chatisgarh	Other Technologies details (IP MPLS)	2	118	Yes	
	For Smart Grid Operation	2	127	Yes	

Note*: Above data is not exhaustive and further detail shall be aquired during detailed survey.

GOA



Appendix- B

Project Implementation Schedule

Sl. No.	Task Name	Task Completed By	Months after Notification of Award (NOA)																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Schedule for UNMS Supply & Erection Package Portion	20 months																				
1	Notification of Award (NOA)	0 days																				
2	Site Survey (at Regional & State level)	3th Month																				
3	Database Development	4 Month																				
4	Design & Engineering	4th Month																				
5	Factory Testing of Systems	11th Month																				
6	Supply and Installation	13th Month																				
7	Integration with the existing System & Commissioning	14th Month																				
8	Site Acceptance Testing of Systems	17th Month																				
9	Availability test and taking Over	20th Month																				

Appendix -C

BoQ of UNMS

Sr. No.	Description	Unit	UNMS (Main) -WR2	UNMS (Backup) - WR1
	Software			
1	NETWORK RESOURCE MANAGEMENT	LOT	1	1
2	NETWORK CONFIG. AND PLANNING MANAGEMENT	LOT	1	1
3	FAULT MANAGEMENT SYSTEM	LOT	1	1
4	PERFORMANCE MANAGEMENT SYSTEM	LOT	1	1
5	TROUBLE TICKETING SYSTEM	LOT	1	1
6	REPORTING & DASH BOARDING SYSTEM	LOT	1	1
7	DATABASE SOFTWARE (DB)	LOT	1	1
8	OPERATING SYSTEM (OS)	LOT	1	1
9	BACKUP & RESTORE SOFTWARE	LOT	1	1
10	HOT BASED IDS FOR ALL MACHNIES	LOT	1	1
11	SOFTWARE FOR DATA REPLICATION SERVER	LOT	1	1
12	SW for Config management Ser cum CMC	LOT	1	1
13	WEB SERVER SYSTEM SOFTWARE	LOT	1	1
14	ANTIVIRUS SOFTWARE	LOT	1	1
15	IDENTITY AND PATCH MANAGEMENT SOFTWARE	LOT	1	1
16	SMS/EMAIL ESCALATION SOFTWARE LICENSE	LOT	1	1
17	SOFTWARE ADAPTERS FOR NETWORK ELEMENT	LOT	1	1
18	NMS & Element Manager-Software	SET	1	0
19	INTEGRATION BUS	LOT	1	1
20	SOFTWARE FOR SAN & NAS STORAGE	LOT	1	1
21	SOFTWARE FOR DATA HISTORIAN	LOT	1	1
22	SW for development server cum test bench	LOT	1	1
	Hardware			
	Servers & accesories			
1	SERVERS FOR NETWORK RESOURCE MANAGEMENT	EA	2	2
2	Server for design, activ, plan, config	EA	2	2
3	SERVERS FOR FAULT MANAGEMENT SYSTEM	EA	2	2
4	SERVERS FOR PERFORMANCE MANAGEMENT	EA	2	2
5	SERVERS FOR TROUBLE TICKETING	EA	2	2
6	SERVERS FOR REPORTING & DASH BOARDING	EA	2	2
7	WEB SERVERS	EA	2	2
8	Configuration management Server cum CMC	EA	2	2
9	DATA REPLICATION SERVER	EA	2	2
10	ANTIVIRUS MANAGEMENT SERVER	EA	2	2
11	IDENTITY AND PATCH MANAGEMENT SERVER	EA	2	2
12	SAN System	EA	2	2
13	DATA HISTORIAN SERVER	EA	2	2
14	Development server cum test bench	EA	1	1
15	NAS System	LOT	1	1
16	POWER CABLES AND ACCESSORIES FOR U-NMS	LOT	1	1
17	44U SERVER RACK WITH KVM SWITCH & MONITOR	LOT	1	1
18	NMS & Element Manager-Hardware	SET	1	0
	Consoles, Laptop for state			
1	WORKSTATION Console dual 24" for state	EA	8	6
2	WORKSTATION CONSOLE - one monitor for state	EA	4	3
	Consoles, Laptop & Video Wall System			
1	WORKSTATION CONSOLE -DUAL 24" for server location	EA	4	2
2	WORKSTATION CONSOLE - one monitor for server location	EA	3	1
3	Remote console Wall mounted 55" screen	EA	2	0
4	Processor Terminal (Laptop)	EA	1	1
5	55 INCH (4X3) VIDEO WALL	EA	1	0
	Routers			
1	WAN ROUTERS for state	EA	8	4
2	WAN ROUTERS for server location	EA	6	6
	Switches			
1	24 Port L-3 LAN SWITCH for state	EA	8	6
2	24 Port L-3 LAN SWITCH for Server location	EA	14	14
	Firewall			

Appendix -C

BoQ of UNMS

Sr. No.	Description	Unit	UNMS (Main) -WR2	UNMS (Backup) - WR1
1	Internal FIREWALL with IDPS for state	EA	8	6
2	External firewall (UTM) with IDPS-state	EA	8	6
3	Internal FIREWALL with IDPS -Server location	EA	2	2
4	External firewall (UTM) with IDPS-Server location	EA	2	2
	Printers for state			
1	Colour Laser Printer	SET	4	3
	Printer for server location			
1	Colour Laser Printer	EA	1	1
	FURNITURE for State	LOT		
1	U-type workstation desk - Normal	EA	8	6
2	Workstation desk	EA	4	3
3	Operators Chairs	EA	12	9
	FURNITURE for Server Location	LOT		
1	U-type workstation desk- Motorized	EA	2	1
2	U-type workstation desk - Normal	EA	1	1
3	Workstation desk	EA	4	1
4	Operator Chairs	EA	7	3
	Auxiliary Power Supply			
1	40KVA, 32KW AT 0.8 PF UPS	SET	2	2
2	VRLA TYPE BATTERY BANKS	LOT	2	2
3	INPUT ACDB (150 KVA)	EA	1	1
4	OUTPUT ACDB (100 KVA)	EA	1	1
5	ACCESSORIES-MAINTENANCE OF VRLA BATTERY	LOT	1	1
6	POWER DISTRIBUTION AND CABLING WORK	LOT	1	1
7	UPS MONITORING SYSTEM	LOT	1	1
8	ISOLATION TRANSFORMERS FOR UPS	LOT	1	1
	GPS & Display for server location			
1	GPS CLOCK WITH ANTENNA	EA	1	1
2	Time and System availability display	EA	1	1
	Display for state			
1	Time and System availability display	EA	4	3
	Supply- For CTUIL HQ			
1	WAN ROUTERS	EA	2	
2	Internal FIREWALL	EA	2	
3	24 Port L-3 LAN SWITCH	EA	2	
4	WORKSTATION CONSOLE - one monitor	EA	1	
5	U-type workstation desk	EA	1	
6	Operators Chairs	EA	1	
	Supply- For WRLDC			
1	WAN ROUTERS	EA		2
2	Internal FIREWALL	EA		2
3	24 Port L-3 LAN SWITCH	EA		2
4	WORKSTATION CONSOLE - one monitor	EA		1
5	U-type workstation desk	EA		1
6	Operators Chairs	EA		1
	Supply- For WRPC			
1	WAN ROUTERS	EA		2
2	Internal FIREWALL	EA		2
3	24 Port L-3 LAN SWITCH	EA		2
4	WORKSTATION CONSOLE - one monitor	EA		1
5	U-type workstation desk	EA		1
6	Operators Chairs	EA		1
	Service (Integration including supply)			
1	INTEGRATION WITH NETWORK NMS	EA	20	20
2	INTEGRATION WITH NETWORK ELEMENTS	EA	200	200
3	INTEGRATION WITH UNMS	LOT	1	1
	Training			

Appendix -C

BoQ of UNMS

Sr. No.	Description	Unit	UNMS (Main) -WR2	UNMS (Backup) - WR1
1	TRAINING- COMPUTER SYSTEM HARDWARE	LOT	1	1
2	TRAINING- SERVICE FULLFILMENT SYSTEM	LOT	1	1
3	TRAINING SERVICE ASSURANCE SYSTEM	LOT	1	1
4	TRAINING REPORTING &DASH BOARDING SYSTEM	LOT	1	1
	AMC			
1	AMC OF UNMS 1 YR WRY(SERVER LOCATION)	LOT	1	1
2	AMC OF UNMS 6 YR AFTER EXP OF WRY (Server Loc)	LOT	1	1
3	AMC OF UNMS 1 YR Warranty-State	LOT	4	3
4	AMC OF UNMS 6 YR AFTR Warranty-State	LOT	4	3
5	YEARLY CYBER SECURITY AUDIT	LOT	1	1

Appendix-D

DRS OF HARDWARE

- 1. Servers for Network Resource Management, Design, Activation, Planning & Configuration, Fault Management, Performance Management, Trouble Ticking, Reporting & Dash boarding, Data Historian, PDS Cum Test Bench, Data Replica, Web etc. - (Please fill for each server as per BOQ)**

S. No	Description of the Features	Minimum Quantity of the features	Offer by the Contractor
1.	Application		
2.	Manufacturer		
3.	Model No.		
4.	Country of Origin		
5.	No. of CPUs & Cores and Processor Clock frequency	2x8 Min 3.2 GHz	
6.	RAM	512 GB	
7.	Internal Auxiliary memory	500GB delivered expandable up to 1TB	
8.	Internal Optical Drive	DVD (R+W)	
9.	Interfaces Ports	10 Gbps dual Fibre Optic Ports (Minimum) for connecting on dual Fibre optic LAN in each server at Main & Backup Control Centre	
10.	Power Supply (Watts)	Dual AC Power Supply	
11.	User interface	Through a common TFT monitor, keyboard & mouse connected through KVM Switch in a server rack.	
12.	Mounting	Rack mountable	

2. Servers for Configuration Management Cum CMC, Antivirus, Identity & Patch Management etc. (Please fill for each server as per BOQ)

S. No	Description of the Features	Minimum Quantity of the features	Offer by the Contractor
1.	Application		
2.	Manufacturer		
3.	Model No.		
4.	Country of Origin		
5.	No. of CPU & Core and Processor Clock frequency	2x8, Min 3.2 GHz	
6.	RAM	256 GB	
7.	Internal Auxiliary memory	500GB delivered, expandable up to 1TB	
8.	Internal Optical Drive	DVD (R+W)	
9.	Interfaces Ports	10 Gbps dual Fibre Optic Ports (Minimum) for connecting on dual Fibre optic LAN in each server at Main & Backup Control Centre	
10.	Power Supply	Dual AC Power Supply	
11.	User interface	Through a common TFT monitor, keyboard & mouse connected through KVM Switch in a server rack.	
12.	Mounting	Rack mountable	

3. Workstation consoles with dual/ single monitor

S. No	Description of the Features	Minimum Quantity of the features	Offer by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		
4.	Specint & Specfp	As per the base runtime requirements of SPEC CPU 2006 or latest benchmarking standards	
5.	Processor	Min 1x4 Core, Clock Speed >3.2 GHz	
6.	RAM	32 GB delivered, expandable up to 256GB	

7.	Internal Auxiliary memory	500GB delivered, expandable up to 1 TB	
8.	Internal Optical Drive	DVD(R+W)	
9.	Speakers	In Built	
10.	Interfaces Ports	10 Gbps dual Fibre Optic Ports (Minimum) for connecting on dual Fibre optic LAN in each server at Main & Backup Control Centre and SLDCs, USB Ports, HDMI Ports	
11.	Power Supply	AC Power Supply	
12.	User interface	One/Two 24" (Approx.) wide screen (16:9 aspect ratio), Full HD with resolution (1920x1080) LED Colour monitors, wireless Wi-Fi based keyboard & optical mouse	
13.	Mounting	Desktop mounting	

4. Remote console:

S. No	Description of the Features	Minimum Quantity of the features	Offer by the Contractor
1.	Manufacturer		
2.	Model No.	The compute platform (CPU) shall be inbuilt into display or Separate CPU shall be provided along with the display.	
3.	Country of Origin		
4.	Specint & Specfp	As per the base runtime requirements of SPEC CPU 2006 or latest benchmarking standards	
5.	RAM	32 GB delivered, expandable up to 256GB	
6.	Internal Auxiliary memory	500 GB delivered, expandable up to 1 TB	
7.	Processor	Min 1x4 Core, Clock Speed >3.2 GHz	

8.	Speakers	in built speakers	
9.	Interfaces ports	10 Gbps dual Fibre Optic Ports (Minimum) for connecting on dual Fibre optic LAN in each server at Main & Backup Control Centre and SLDCs, USB Ports, HDMI Ports. Use of external converters are allowed.	
10.	User interface	55" wide screen, HD Resolution (1920x1080), 24x7 duty professional LED display, wireless keyboard & optical mouse	
11.	Mounting	Wall /Floor mounting	
12.	Power Supply	AC Power Supply	

5. LED Color Monitors for Work Stations:

S. No	Description of the Features	Minimum Quantity of the features	Offer by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		
4.	Diagonal Viewable size	24"	
5.	Colour support	16.7 million	
6.	On screen control	Required	
7.	Response time	Maximum 15 ms	
8.	Tilt	Yes	
9.	Aspect ratio	16:9	
10.	Anti-glare & anti-static	Yes	

6. KVM for Servers

S. No	Description of the Features	Minimum Quantity of the features	Offer by the Contractor
1.	Manufacturer		

2.	Model No.		
3.	Country of Origin		
4.	Components	Rack Mountable Monitor, Keyboard, Mouse along with KVM Switch	
5.	Diagonal Viewable size	17" (Approximately)	
6.	Colour Support	16.7 million	
7.	Antiglare & anti-static	Yes	
8.	Aspect Ratio	16:9 or 4:3	

7. Processor Terminal (Laptop)

S. No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Processor	Min 1x4 Core, Clock Speed >3.2 GHz	
4.	RAM	16GB	
5.	Internal Auxiliary memory – with SSD hard disk	1 TB	
6.	Internal/External Optical Drive	DVD±RW	
7.	Monitor	15" (Approximately)	
8.	Keyboard and mouse	Wireless/Wi-Fi	
9.	Web cam	Inbuilt	
10	Interfaces	Interfaces -1 Gb dual Ethernet ports, Minimum 3 x USB 3.0 Gen 1 & 1x Type C ,1 HDMI Port.	

11	Video Graphics Card	Min 2 GB	

8. Color Laser Printer

S. No.	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of origin		
4.	Functions	Print, scan, email	
5.	Paper size	A3, A4	
6.	Print speed	30 Color pages/minute of A4 size & 15 Color pages/minute of A3 size.	
7.	Print resolution	600 x 600 dpi	
8.	Paper weight	75-200 GSM	
9.	First page out time	10 sec for Black & White, 15 sec for Colour	
10.	Duty cycle	100000 pages per month	
11.	Paper handling capacity	Minimum 500 sheets of input tray & 250 sheets of output tray.	
12.	Automatic Duplex printing	Yes	
13.	Landscape and portrait orientation	Yes	
14.	Interface	1Gb LAN port	
15.	Heat Load		

9. Video Wall System

S. No.	Description of the Features	Minimum Quantity of the features required	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Display technology	LED based rear projection	
4.	Each VPS module size	55" Diagonal	
5.	Aspect ratio	16:9	
6.	Colours	16.7 million	
7.	VPS projector resolution	Minimum 1920x1080 (Full HD)	
8.	Inter modular gap	< 1.0 mm	
9.	Screen border	0 mm (No border)	
10.	Horizontal & Vertical viewing angle	$\pm 160^\circ$ (approx.)	
11.	Luminance measured at the screen	Minimum 170 candelas/sq.m	
12.	Median LED life	Minimum 55000 Hours	
13.	Centre to corner uniform brightness	> 90%	
14.	Brightness adjustable through software	Yes	
15.	Contrast ratio (Adjustable through software)	1500:1	
16.	Operating temperature range	16 – 30 ⁰ C	
17.	Operating Relative Humidity	20-80% non-condensing	
Controller Features:			
18.	RAM	16 GB expandable to 32GB	

19.	Internal Auxiliary Memory	500 GB	
20.	Optical Drive	DVD±R	
21.	User Interface	Keyboard & Optical Mouse (dual band wireless)	
22.	Power supply	Dual redundant hot swappable	
23.	Interface with VPS	Audio Video signal input module with 2 video, 2 audio & 2 RGB inputs	
24.	Types of video signal to be supported by VPS Controller	PAL SECAM NTSC HDTV 720p, 1080i, 1080p (Component) RGB Analog up to 1920x1200 (up to 165 MHz pixel clock) DVI up to 1920x1200 (up to 165 MHz pixel clock).	
25.	Time synchronisation	SNTP,NTP	
26.	Dual AC Power Supply (in Watts)		
27.	Heat Load		
28.	Streaming video from video camera	Video client application software	
29.	Capability to display videos directly from video camera	Yes	

10. Firewall Features/Characteristics required of External Firewall:

S. No.	Description of the Features	Minimum Quantity of the features	Offered by the Contractor

1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		
4.	Data encryption support	3DES (168 bits), AES 128-, 192-, 256-bit and hashing algorithm like MD5, SHA-1, IKE, PKI (X.509) and IKEv2 with EAP.	
5.	Support Active-Active mode	Yes	
6.	High Availability & Load balancing	Yes	
7.	Support NAT, PAT & Policy based NAT/PAT, Mapped IP (MIP), Virtual IP(VIP) & MIP/VIP grouping	Yes	
8.	IP address assignment features	PPPoE, DHCP	
9.	Support VoIP protocols	H.323, SIP, MGCP, SCCP	
10.	IPv6 features	Syn Cookie, Syn-proxy DoS attack detection, SIP, RSTP, Sun-RPC, ALG's, RIPng, BGP4**, DHCPv6 Relay, IPv4 to IPv6 translations & Encapsulations. ** wherever applicable	
11.	System management	Using web UI, Command Line interface (console/telnet/SSH).	
12.	Filtering of packets based on Source address, destination address, protocol type, user, port number, URL.	Yes	
13.	Filtering of protocols	FTP, SMTP, HTTP, HTTPS, SNMP, UDP, ICMP, RPC, DNS, DHCP, ARP, TCP, POP3	

14.	Authentication protocols	RADIUS, LDAP methods	
15.	Dynamic routing protocols	RIP v2, OSPF, & BGP** ** wherever applicable	
16.	DoS & DDoS prevention	Yes	
17.	TCP reassemble for fragmented packet protection	Yes	
18.	Brute Force attack mitigation	Yes	
19.	SYN cookie protection	Yes	
20.	Zone based IP spoofing	Yes	
21.	Malformed packet protection	Yes	
22.	DNS guard features/ Equivalent Industry standards	Yes	
23.	Content filtering	JAVA & ActiveX blocking	
24.	Antivirus, Anti-worm, anti-spam and anti-spyware protection	Yes	
25.	System Logging & monitoring	Syslog, Email, SNMPv3 (With backward compatibility) and VPN Tunnel Monitor.	
26.	Stateful packet inspection	Yes	
27.	Detect and protect based on Geo location (added-eg. C Country, B-Country/Continent, etc.)	Yes	
28.	Detect devices based on operating system (added in sec-4 also)	Yes	

29.	Detail logging and packet capture (added basic feature of any IPS)	Yes	
30.	Detail granular/customized reporting -added	Yes	
31.	Anti-APT (or Anti BOT), Adv Persistent Threat	Yes	
32.	Threat Extraction/Sandboxing/File sanitisation (additional software blade shall be needed for advance cyber security) at gateway level- for web server file upload/download req for monthly upload, 1 GB (peak) daily including PDF or word or excel files.	Yes. On premise. (Sandboxing shall be supplied at Main and backup Control Centre only)	
33.	Prevention of Dodos & Dos-added		
34.	Out of Band log and Config management		
35.	Power Supply (in Watts)		
36.	Heat Load		

11. Sizing Parameters External Firewall:

S.No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	No. of users	Unlimited	

4.	Minimum number of concurrent sessions	1 Million	
5.	Minimum new sessions per second processing	20,000	
6.	Minimum Firewall + IPS throughput	1.5 Gbps** **for continuous traffic at full capacity, firewall loading shall not exceed 30% of throughput capacity with all firewall features ON at Control Centre.	
7.	Minimum 3DES/AES VPN throughput	350 Mbps	
8.	No of VLANs	200	
9.	Minimum IPSec VPN peers	200	
10.	Minimum number of ports	8x10 Gbps Fibre optic ports and 8x1 Gbps Ethernet Ports at Server Location 4x10 Gbps Fibre optic ports and 4x1 Gbps Ethernet Ports at State	

12. Firewall Features/Characteristics required of Internal Firewall/UTM:

S. No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Data encryption support	3DES (168 bits), AES 128-, 192-, 256-bit and hashing algorithm like MD5, SHA-1, IKE, PKI (X.509) and IKEv2 with EAP.	
4.	Support Active-Active mode	Yes	

5.	High Availability & Load balancing	Yes	
5.	Support NAT, PAT & Policy based NAT/PAT, Mapped IP (MIP), Virtual IP(VIP) & MIP/VIP grouping	Yes	
7.	IP address assignment features	PPPoE, DHCP	
8.	Support VoIP protocols	H.323, SIP, MGCP, SCCP	
9.	IPv6 features	Syn Cookie, Syn-proxy DoS attack detection, SIP, RSTP, Sun-RPC, ALG's, RIPng, BGP4**, DHCPv6 Relay, IPv4 to IPv6 translations & Encapsulations. ** wherever applicable	
10.	System management	Using web UI, Command Line interface (console/telnet/SSH).	
11.	Filtering of packets based on Source address, destination address, protocol type, user, port number, URL.	Yes	
12.	Filtering of protocols	FTP, SMTP, HTTP, HTTPS, SNMP, UDP, ICMP, RPC, DNS, DHCP, ARP, TCP, POP3	
13.	Authentication protocols	RADIUS, LDAP methods	
14.	Dynamic routing protocols	RIP v2, OSPF, & BGP** ** wherever applicable	
15.	DoS & DDoS prevention	Yes	
16.	TCP reassemble for fragmented packet protection	Yes	

17.	Brute Force attack mitigation	Yes	
18.	SYN cookie protection	Yes	
19.	Zone based IP spoofing	Yes	
20.	Malformed packet protection	Yes	
21.	DNS guard features/ Equivalent Industry standards	Yes	
22.	Content filtering	JAVA & ActiveX blocking	
23.	Antivirus, Anti-worm, anti-spam and anti-spyware protection	Yes	
24.	System Logging & monitoring	Syslog, Email, SNMPv3 (With backward compatibility) and VPN Tunnel Monitor.	
25.	Stateful packet inspection	Yes	
26.	Assign Zones to Virtual & physical interfaces	Yes	

13. Sizing Parameters Internal Firewall/UTM:

S. No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	No. of users	Unlimited	
4.	Minimum number of concurrent sessions	1 Million	
5.	Minimum new sessions per second processing	20,000	

6.	Minimum Firewall + IPS throughput	1.5 Gbps** **for continuous traffic at full capacity, firewall loading shall not exceed 30% of throughput capacity with all firewall features ON at Control Centre.	
7.	Minimum 3DES/AES VPN throughput	350 Mbps	
8.	No of VLANs	200	
9.	Minimum IPSec VPN peers	200	
10.	Minimum number ports	8x10 Gbps Fibre optic ports and 8x1 Gbps Ethernet Ports at Server Location 4x10 Gbps Fibre optic ports and 4x1 Gbps Ethernet Ports at State	

14. WAN Router (Router cum Firewall)

S.No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		
4.	Functions	High performance Routing for data exchange between data centres and remote.	
5.	Routing Capability	Layer -2 & Layer-3 routing & Dynamic discovery of routing	
6.	Processing capacity	Minimum 2 Mpps	
7.	Features to support	QoS, MPLS, Security, Broadband, Multiservice, Voice, IP to IP Gateway	

8.	Routing protocols	IS-IS, OSPF, BGP**, ARP, IPCP, IP forwarding, VLAN & MPLS etc. ** Wherever applicable	
9.	Network protocols	TCP/IP, IPv6, OSI, Telnet, UDP, DHCP	
10.	Network management	Using SNMP Protocol	
11.	Minimum Inbuilt software firewall features	a. Data Encryption supported DES (56bits) 3DES (168 bits) and hashing algorithm like MD5 and SHA-1 b. Filtering of packets based on source address, destination address, protocol type, user, port number, URL c. Filtering of protocols such as FTP, SMTP, HTTP, SNMP, UDP, ICMP, RPC, DNS, DHCP, ARP d. Minimum 100 IPsec VPN tunnels support e. Detailed system logging	
12.	Speed configurability at each port	All ports shall be configurable from 64kbps to 2Mbps	
13.	Interface support (IPv4 and IPV6 – compliant)	There shall be 50% spare ports in every router over above the BOQ specified quantity of ports Router should support 1 GB, 10 GB As a minimum 10 no. - 1 GB Ethernet ports, 4x10 Gbps Fibre optic ports	
14.	Mounting	Rack mountable	

15. LAN Switch

S.No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		

4.	Functions	For connecting all servers & peripheral devices on Local Area Network (LAN).	
5.	Conform to standards	ISO8802 or IEEE 802 Series Standards	
6.	Switching capability	Layer-3 switching & VLAN	
7.	Interface ports	10 Gbps Fibre Optic Ports for Connecting dual Fibre Optic LAN at Server location and State Minimum 8x10 Gbps Fibre Optic Ports and 16x1 Gbps Ethernet ports at Server location Minimum 4x10 Gbps Fibre Optic Ports and 8x1 Gbps Ethernet ports at state	
8.	Cable standard	Cat 6 or higher bandwidth cable	
9.	Mounting	Rack mountable	

16. SAN (Storage Area Network) based storage or any other specialized storage solution

S. No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		
4.	Capacity	Minimum usable capacity of 50 TB	
5.	Spare SSD	1 Nos.	
6.	Expandability	50% Spare Slots	
7.	RAID Level	RAID 6/ Dual Parity	
8.	SAN Type and interface ports	iSCSI/Ethernet/Fibre Optic Ports as applicable	
9.	Snapshot feature with license	Yes	

10.	Solid State Drive	All Flash System with SSD	
11.	Hot Swappable Solid State Drive	Yes	
12.	Dual Power Supply	Yes	

17. Network Attached Storage (NAS)

S. No.	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		
4.	Capacity	Minimum usable capacity of 10 TB	
5.	Spare SSD	1 Nos.	
6.	Expandability	50% Spare Slots	
7.	RAID level	RAID 6/ Dual Parity	
8.	Solid State Drive	All Flash System with SSD	
9.	Hot Swappable Solid State Drive	Yes	
10.	Dual Power Supply	Yes	

18. Tape Library (NAS)

S. No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1	Manufacturer		
2	Model No.		
3	Function	Archival of Data on SAN and NAS	
4	Drive technology	LTO-5 or Latest	
5	No. of Drive	Minimum 2	

6	No. of Cartridges Slots	12	
7	Capacity	Minimum 18 TB	
8	Interface	SAS	
9	Compression ratio	2:1	

19. Server Panels

S. No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Country of Origin		
4.	Functions	For mounting or placement of equipment's	
5.	Mounting	Floor mounted with front & rear access to hardware and wiring	
6.	Cable entry	Bottom	
7.	Internal lighting lamp	Yes, with door interlock	
8.	230V AC, 15/5 A Internal power socket with switch	Yes	
9.	All material used in the panel are flame retardant	Yes	
10.	All Louvers provided with suitable wire mesh	Yes	

20. GPS based time facility

S.No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		
2.	Model No.		
3.	Time stability of internal time base	Minimum 2ppm	
4.	Propagation delay compensation	Yes	
5.	Include an offset to permit correction to local time	Yes	
6.	Reverting to internal time base upon loss of signal from UTC source	Yes	
7.	Resynchronization Delay	Not more than 5 minutes.	
8.	Accuracy of resynchronization	< 1.5 Micro Sec	
9.	Interfaces	Ethernet ports - 2 IRIG-B port - 2	
10.	Power Supply (in Watts)		
11.	Heat Load		

21. Digital Displays for GPS Based Time facility

S.No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
1.	Manufacturer		

S.No	Description of the Features	Minimum Quantity of the features	Offered by the Contractor
2.	Model No.		
3.	Functions	For viewing UTC day of the year and time and availability	
4.	Day display format	XXX (MON through SUN)	
5.	Time Display format	24 Hours, HH:MM:SS, where hour display will be from 00 to 23 hours format.	
6.	Date format	MM: DD: YY	
7.	Frequency display format	XX.XX Hz	
8.	Display digit requirements	Display Digit height ≥ 7.5 cm	
9.	Mounting of displays	Wall/panel mounting	
10.	U-NMS Interfaces	Availability	
11.	Power Supply (in Watts)		
12.	Heat Load		

APPENDIX-E

SYSTEM DESIGN PARAMETERS

The U-NMS system shall be designed as per the technical parameters defined in the specification and as specified here.

The U-NMS system sizing such as databases, network elements, etc. shall be done to accommodate expansion by **200%** i.e. equal to **300%** of the present system sizes specified in Appendix G and calculated value sizing requirements specified in Appendix E.

The Historian system sizing shall be such as to accommodate expansion by **200%** i.e. equal to **300%** of the present system sizes specified in Appendix G and calculated value sizing requirements specified in Appendix E. The import data from past history shall be over and above the 300% size mentioned.

The auxiliary memory utilization of any of the server shall not exceed 25% of its delivered capacity. This memory utilization includes the memory used for storage of data for the defined duration as specified in the technical specification.

The following tables specify the design capacities, execution rate, and response times required. Depending on the type of item, the design capacity represents either the total number of that item to be supported by the installed computer system or the rate at which that item shall be processed. No. of points specified under Design Capacity shall include the expansion requirements also.

The execution rate indicates how frequently a function shall execute if it is a periodic function. Some functions execute periodically as well as upon request and/or as a result of external conditions. Other functions execute strictly as needed, upon request, and/or as required by the external conditions.

The response time indicates the maximum acceptable wall-clock time to complete a function and to present and/or store the results, as appropriate. In the case of data exchange between the computer systems, the delivery time is the elapsed time between initiation of the data transmission request by one system and storage in the application function database of the receiving system, assuming there is no delay due to the communications line.



TABLE 1 – DESIGN PARAMETERS

Domain	Design Parameter	Remark
Inventory Management	Frequency of data discovery	Every 24 hours
Performance Management	Retention of raw performance data (as collected from network elements) from the date of collection	3 months
	Retrieval of Performance	-15 Min Interval or exception
	Monitoring statistics from the NEs	-24 Hr Interval
Fault Management	Alarms log (Critical & major alarms) and Reports- as finalized during detailed engineering	7 years
Trouble Ticketing	Trouble ticketing text size in words (min)	500
Dashboard & Reporting	Dashboard display	5 dashboards each containing minimum 10 reports with 5 key performance indicator (KPIs) per report)
	Dashboard updating frequency	Once every 5 minutes
Data Storage	Online data storage	1 years
	Offline Data Storage	2 years
	Achieve Data	7 years

TABLE 2 – DESIGN PARAMETERS FOR U-NMS FUNCTIONS

Function Description	Design Capacity	Execution Rate	Response Time
Telemetry failure and Delete from Scan			
No. of communication retries	5		
Data Exchange across U-NMS (between other Regional/National U-NMS server)			
Database management for individual responsibility area network through remote login	No. of Parameter specified in Appendix-G	Updation/Configuration by exception or on demand	5 sec
Data exchange with other/Offline system application			
Real-time data & Alarms	No. of Parameter specified in Appendix-G	5 sec or by exception	1 sec

Function Description	Design Capacity	Execution Rate	Response Time
Historical data	No. of Parameter specified in Appendix-G	Scan Rate or by exception	5 sec
Continuous Real-time data storage			
Sizing	No. of Parameter specified in Appendix-G	Each time the value is received in U-NMS	
Sequence-of-Events recording	100 events circular buffer in the U-NMS database	Each time the value is received in U-NMS	5 sec

TABLE 3 – Design Parameters for ISR/Historian System FUNCTIONS

FUNCTION DESCRIPTION	DESIGN CAPACITY	EXECUTION RATE	RESPONSE TIME
Real-time data snapshot			
No. of data	No. of Parameter specified in Appendix-G	5 seconds to 1 hour	15 sec
Duration of online storage	1 Years		
Storage of U-NMS system statistics			
Duration of Online storage	1 Year	AS per spec	
SOE Data	1 Years	Every 15 minutes	1 minute
Historical information - Storage of files and save cases	20 save cases and 20 output results of U-NMS Application	As per spec	5 Minute
System message Log Storage & Retrieval			
No. of logs storage	10,000 entries per day	15 minutes	
Online storage	1 Years		
Historical trend (Historian)	On demand for any of the stored value	As per spec	15 sec

TABLE 4 - Design Parameters for U-NMS Functions

NAME	DESIGN CAPACITY	EXECUTION RATE	RESPONSE TIME
Congestion Scenario Planning		On demand or Daily	1 minute
Port allocation	No. of Parameter specified in Appendix-G	On demand	1 minute
Future Planning/ study	No. of Parameter specified in Appendix-G	On demand	1 minute
Simulation of new scenario in Network Planning Tool	No. of Parameter specified in Appendix-G	On demand	1 minute

Table 5 - Design Parameters for Configuration Characteristics

DESCRIPTION	DESIGN CAPACITY	EXECUTION RATE	RESPONSE TIME
Backup Databases Data backup		30 seconds or event driven	5 seconds
Server Errors and failure detection			10 seconds
Device Errors and failure detection			10 seconds
Server failover Function period < 30 secs. Function period > 30 secs.			60 seconds 120 sec
Server Start-Up Hot Start Warm Start Cold Start			5 minutes 10 minutes 15 minutes
Device Failover			30 seconds
Main and Backup Control centre			
Real-time data Update		10 seconds	2 seconds
Integrity scan		10 Minutes	
Monitoring of each other's availability		2 minutes	2 seconds

TABLE 6 - Design Parameters for Training Simulator

DESCRIPTION	DESIGN CAPACITY	EXECUTION RATE	RESPONSE TIME
Communication Network Model	10		
Network Modelling	No. of Parameter specified in Appendix-G	5 minutes	5 seconds
Region/bandwidth/Make/Service/State/Technology etc. wise Model	No. of Parameter specified in Appendix-G	5 minutes	5 seconds
Number per UNMS centre Simulation			
Normal Network State	125	5 minutes	5 seconds
Configuring & provisioning of Bandwidth for end to end.	20	5 minutes	5 seconds
Redundancy Adequacy	25	5 minutes	5 seconds
Loss of major backbone of communication	15	5 minutes	5 seconds

APPENDIX-F

PERFORMANCE PARAMETERS

The UNMS shall be designed as per the technical parameters defined in the specification and as specified here.

The UNMS system (e.g. for databases, network elements, EMS/NMS etc.) shall be sized to accommodate expansion by 200% of the present Communication network size, i.e. it shall be sized to accommodate three times of the existing system size (Appendix-G).

The auxiliary memory utilisation of any of the computers shall not exceed 25% of its delivered capacity. This memory utilisation includes the memory used for storage of data for the defined duration as specified in the technical specifications.

The performance specified here are the maximum times required of the user interface during average and peak loading conditions. Averaged or other statistically processed response and update times will not be acceptable. The execution periodicity and response rate mentioned in Appendix E; shall be maintained for all the application software.

The performance analysis to confirm the ability of each system to meet employer's performance requirements will be submitted by the Contractor during detailed engineering.

Failure to meet the performance criteria shall require the contractor to provide all necessary hardware and software modifications and additions until the performance criteria are satisfied.

Table 1 – PERFORMANCE REQUIREMENTS

(a) User Interface Requirements:

Domain	Performance Requirement	Response Time
Inventory Management	Data extraction from existing NMS/NEs for network discovery	Near real time
Design, Configuration & Provisioning Management	End-to-End circuit provisioning time in system across multiple equipment of multiple vendor after approval of process	≤10 minutes
	Switching to protection path in case of failure of main path	≤50msec
	Addition of new element in UNMS	≤ 5 minutes
Fault Management	Alarm and Event acknowledgement	≤ 2 Seconds
	Primary Root Cause Analysis (RCA) computation:	≤ 3 minutes
Performance Management (PM)	Reporting capability of PM tool	<10 seconds processing time for every 1000 rows of data
Trouble Ticketing System	Average Time for ticket creation: a. Automatically by Resource Trouble Management based on alarm/event in the network	≤ 10 Seconds

	b. Automatically based on pre-defined schedules for planned maintenance c. After manual reporting by User d. update in system (after successful closure of fault closing)	≤ 10 Seconds ≤ 2 Minutes ≤ 2 Minutes
	SMS and Email triggering time (as per escalation matrix)	≤ 5 Minutes
Dash boarding & Reporting Facility	Report generation (any type of report) a. Auto b. Customised	< 20 seconds with 100 concurrent users ≤ 5 Minutes
User Interface Requirements	Requests for call-up of displays shall be acknowledged with an indication of request is being processed	Within 2 seconds
	Any real time display and application display	Within 3 seconds after acknowledgement of request
	Manual data entry of the new value shall appear on screen	Within 2 seconds
	Display (including Trends) update rate	Every 2 seconds for 4 displays together to be completed in 0.5 seconds
	Panning of display from one end of screen to other end of screen in a continuous manner	Within 2 seconds
	Response time for display of Alarm and event after receipt in UNMS system	Within 2 seconds
	Alarm and event acknowledgement	Within 2 seconds
	Request for printing of displays shall be acknowledged with an indication of request is being processed	Within 2 seconds
	Request for generation of reports shall be acknowledged with an indication of request is being processed	Within 2 seconds
	Video Wall system display update rate (shall be performed during SAT)	Every 2 seconds for 4 displays together to be completed in 0.5 seconds
	Export of trend data	1 second
	User request to jump to a different zoom factor shall cause display to be presented	Within 2 seconds

(b) Utilisation

Description	Average Utilization	Remarks
PROCESSOR UTILIZATION	15%	Normal loading
Server	30%	Peak loading
LOCAL AREA NETWORKS	15%	Normal loading
Unconditional Access	25%	Peak loading
AUXILIARY MEMORY	15%	Normal loading
Access & Transfer capacity	25%	Peak loading

(c) Configuration Management Server cum Centralized Management Console
 functionality Impact

The Configuration Management cum Centralized Management Console shall not impact the availability and performance of UNMS and shall not load more than 3% of any host CPU, 1% network bandwidth and shall have secure communication.

Description	Shall not load more than	Remarks
Processor Utilization of any host CPU	3%	Peak loading
Network Bandwidth	1%	Peak loading

Table 2 – NORMAL LEVEL OF ACTIVITIES

The normal level of activity shall stimulate system activities spread over one hour period to generate normal loading scenario. During the testing, the response times and the average utilizations shall not exceed the specified values. The following conditions define normal level of system activity to generate the normal loading scenario. Test simulation shall be done using software tool to generate this loading within 1 hour. Staggering of loads during the test duration of 1 hour is permitted but there shall be at least one hour crossing.

- (a) All data exchange with other systems shall occur as specified in the specifications.
- (b) All periodic functions shall be executed at the rates defined in **Appendix-E**.
- (c) Alarms (10 X no. of Network elements) per hour shall be generated. Each alarm shall be acknowledged individually within 2 seconds.
- (d) Events (10 X no. of Network Elements) per hour shall be generated
- (e) 50 remote actions shall be performed over the 1-hour test period using normal supervisory control procedure.
- (f) 1 display per workstation per minute shall be called up.
- (g) Communication channels shall be monitored as specified.
- (h) Fail and restore 2 links every 30 minutes.

- (i) Web servers to be accessed by 100 people simultaneously.
- (j) The following user interface actions shall be performed.

USER INTERFACE ACTIONS

Display Selection	30 per operator workstation
Data Entry	5 data entry actions from any single display
Reports	Prepare and printing of 10 reports

Table 3 – PEAK LEVEL OF ACTIVITIES

The peak level of activity is in addition to the normal level of activity described above to generate peak loading scenario. The peak level of activity shall be applied for a five minute period. During the next ten minutes, only the normal level of system activity shall be applied. This test shall be repeated for four consecutive fifteen minute periods, for a total peak level test time of one hour.

The software execution rates, response times and performance requirements defined in Appendix-E & F shall not exceed during the peak loading conditions, The following conditions shall define the additional peak level of system activity:

- (a) System Alarms
 - i. 300 alarms in a scan cycle starting the five-minute period
 - ii. 200 alarms per minute for five minutes
 - iii. 50% of alarms shall be acknowledged within the five-minute period
- (b) Display requests – 6 display requests per minute per console
- (c) Remote control – 4 control actions per minute
- (d) Reports – Prepare 30 reports.

Appendix G

SYSTEM SIZING

Domain	Sizing Parameter	Sizing Input
Network Size	Total number of Network Elements (NE)	2000
	No of Data points per NE (such as Rack, Sub Rach. Slot, Port, Auxiliary) and (Link, Channel, Services, MSP details)	30
	Total Number of existing EMS/NMS to be integrated	20
	Number of NEs to be integrated (not being monitored on any EMS/NMS)	200
	Number of State Control Centers	9
	Total Interfaces in network (Physical + Logical)	10000
	No of channels	
	a. Low speed (300-1200 bps) data channels for RTUs	1500 Nos.
	b. 64 Kbps data channels for RTUs/PMUs	500 Nos.
	d. Ethernet data channels	3000 Nos.
Fault Management	e. Voice (2 Wires, 4 Wires) channels	1500 Nos.
	f. Ethernet Voice Channels	2500 Nos.
	g. Teleprotection Channels	1000 Nos.
	Average alarm rate per second	60
	Peak alarms per second	200
Trouble Ticketing System	Total number of alarms per day (Including average & peak hours)	1 million
	Total number of Users	100
	Concurrent number of system users	50
Performance Management	Total number of PM KPIs	30
	Total number of PM Reports	20
	Total number of PM Users	100
	Concurrent number of PM users	50
	Performance monitoring file size per hour each existing NMS	
Dashboard Reporting Facility	Number of Reports	500
Web Portal System	Total number of Users	200 concurrent Users

APPENDIX H

AUXILIARY POWER SUPPLY CALCULATION

Criteria for selection of rating of UPS Battery bank:

VAH rating = Nominal cell voltage x No. of cells x AH capacity of each cell

Considering 40 kVA UPS design for 192 cells of 2 volts, 200 AH each, the VAH capacity of battery bank shall be:

$$76800 \text{ VAH} = 2 \times 192 \times 200 \text{ VAH} = 76.8 \text{ kVAH}$$

In case of UPS design is different from 192 cells, then AH capacity of cells should be selected suitably to meet the total battery bank capacity requirement of 76.8 kVAH.

Note- 2: Mono block design of VRLA Batteries is not acceptable.

APPENDIX I

DATA REQUIREMENT SHEETS OF APS

A. UPS

Sl No.	Description	To be filled by Bidder
1.	Name of the manufacturer	
2.	Model no. of the offered UPS	
3.	Rated capacity (in KVA) for supplying load at 0.8 lagging pf	
4.	Suitable for input frequency of 50 Hz $\pm$ 5%	Yes/No
5.	Suitable for 3-ph Input voltage 415V with -15% to +10% variation	Yes/No
6.	Suitable for input mains phase sequence reversal	Yes/No
7.	Nominal Output voltage 240V, 3-Ph, 4-wire at 50 Hz	Yes/No
8.	Whether degree of protection of enclosures is IP20 & suitable protection of vertical ingress of water from top surface provided	Yes/No
9.	Output frequency (in synchronized mode) adjustable as per specification requirement	Yes/No
10.	Suitable for operation at atleast 3:1 crest factor	Yes/No
11.	Overall efficiency of UPS (with battery fully charged and operating at full load of 32 KW for 40 KVA & 16 kW for 20 KVA UPS at unity power factor) $\geq$ 90%	Yes/No
12.	Suitable for operating ambient temperature of 0 to 50°C, 5 to 95% RH, non-condensing at full rated load of 32/16 kW	Yes/No
13.	Applicable standards for UPS	
14.	Rectifier/Charger Rated output current (Supporting calculations to be furnished)	
15.	Maximum input current total harmonic distortion (THD) at nominal input voltage and under full load $\leq$ 5 % RMS	Yes/No
16.	Whether rectifier/charger is able to re-charge the fully discharged (up to 1.75 V/cell) batteries to 90% State of Charge while carrying full load within 8 hrs	Yes/No
17.	Whether inverter is able to deliver rated full load upto Battery End Cell voltage of 1.75 V/cell	Yes/No
18.	UPS output voltage variation w. r. t. nominal voltage	
19.	Output voltage harmonic distortion ($\leq$ 5 % RMS)	Yes/No
20.	Whether capable of supporting a startup surge or overload of 150% of rated output for 60 secs	Yes/No
21.	Variation in free running frequency w. r. t. nominal frequency of 50 Hz ($\leq$ $\pm$ 0.1%)	Yes/No
22.	Whether the feature of protection logic provided to automatically shut down and isolate from the load when the battery voltage drops below a preset voltage	Yes/No
23.	Whether the UPS is capable of operating in parallel redundant UPS configuration with one or more with equal load sharing and required hardware & software is included in the offer	Yes/No
24.	Static Bypass Switching time $\leq$ 1msec	Yes/No
25.	Whether UPS monitoring software, Windows PC for remote monitoring of UPS systems, interconnecting cables & interfaces included in the offer	Yes/No

Sl No.	Description	To be filled by Bidder
26.	(a) Whether a suitable automatic orderly shutdown software is offered to shutdown the computer systems connected to UPS, in case of UPS problems such as Low Battery voltage, remaining Battery autonomy time, etc. (b) Whether this software shall take into consideration the parallel configuration of the UPS. (c) Whether the offered automatic orderly shutdown software is suitable to operate on different operating systems such as HP UX, IBM-AIX, True64 UNIX (DEC), SUN Solaris, Windows 2000/XP etc. (d) Whether this software is suitable to run simultaneously on about 20 computers incl. servers, workstation consoles & PCs	Yes/No Yes/No Yes/No Yes/No
27.	Whether each UPS is having a SNMP card suitable for connection to the Ethernet LAN of the computer systems	Yes/No
28.	Whether for the UPS panel, the thickness of the structural frames and load bearing members is minimum 2.0 mm and for others is minimum 1.6 mm.	Yes/No
29.	Manufacturer's technical catalogues enclosed with the Bid	Yes/No
30.	Whether offered equipment is type tested as per standards defined in the technical specifications	Yes/No
31.	Whether Type test reports are enclosed for offered or higher rating UPS	Yes/No

B. Battery for UPS (at Control Centre)

Sl No.	Description	To be filled by Bidder
1.	Name of the manufacturer	
2.	Type (maintenance free VRLA) & Model no. of offered Battery	
3.	Battery AH capacity (in AH) at C ₁₀ , 27° C temp.	
4.	Total number of cells in each UPS Battery Bank	
5.	Nominal voltage of each cells	
6.	Applicable standards	
7.	Maximum Boost charging current supported (in % of AH capacity)	
8.	Float charging voltages of each cell	
9.	Boost charging voltages of each cell	
10.	Battery minimum operating life time (in years)	
11.	Manufacturer's technical catalogues enclosed with the Bid	Yes/No
12.	Whether offered battery is type tested as per standards defined in the technical specifications	Yes/No

C. ACDBs (Input & Output)

Sl No.	Description	To be filled by Bidder
1.	Name of the manufacturer	
2.	Input ACDB sized for 40 kVA	Yes/No
3.	Output ACDB sized for 40 KVA	Yes/No
4.	Whether for the ACDB panel, the thickness of the structural frames and load bearing members is minimum 2.0 mm and for others is minimum 1.5 mm	Yes/No
5.	Whether degree of protection of enclosures is at least IP21	Yes/No
6.	Applicable standards of MCCB / MCB are as per specification	Yes/No
7.	Make of MCCB / MCB	
8.	Whether Class “B” & ‘C’ Surge protection devices (Ph-N , N-E) are provided in Input ACDB panel	Yes/No
9.	Make & rating of Class ‘B’ & ‘C’ SPDs	

D. Isolation Transformer

Sr. no.		
1.	Make	
2.	Model no.	
3.	Rating Capacity (kVA)	
4.	Input frequency	
5.	Input frequency tolerance	
6.	Input voltage	
7.	Input voltage tolerance	
8.	Output voltage	
9.	Output frequency	
10.	Country of origin	
Mechanical Details		
1.	Dimensions and enclosure	
2.	Indications	
3.	Degree of protection	
4.	Weight with enclosure	
5.	Temperature	
6.	Type of cooling	

Appendix-J

QUESTIONNAIRE FOR UNM FUNCTION AND APPLICATIONS

The following set of questions has been prepared to aid in evaluation of the UNMS proposals. The Bidder shall submit answers to all questions. **A question that requires a lengthy reply that is already contained in the body of the proposal may be answered by providing an exact volume, section, page and paragraph reference.**

A. General Requirements of Unified Network Management System (UNMS)

Sl. No	Parameter	Available - Yes/No	Particulars
Manufacturer:			
Version #:			
1	What is the RDBMS and NOSQL database software offered with the UNMS? Pl Specify		
2	Specify the Operating System of the offered UNMS?		
3	What is the floor space requirement for Main & Back-up Control Centres?		
4	What is the AC/DC power requirement for Main & Back-up Control Centres?		

B. Fault Management System:

Alarm & Event

Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			

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Sl. No	Parameter	Available – Yes/No	Particulars
Version #:			
Function of the software:			
1	Does the fault management system have inbuilt capability to (FMS) display equipment status in a graphical topological, map-type display? Is the status displayed in different colours based on status?		
2	Can the operator acknowledge and clear alarms individually and as a group?		
3	Does the system provide the feature of maintaining a historical data of alarms?		
4	Are the events processed on real time basis?		
5	Does the offered FMS have inbuilt capability to support alarm reduction through correlation & suppression based on object modelling?		
6	Does offered FMS allow turning the correlation rule on and off? And does it also provide pre-defined correlation rule support?		
7	Does the offered FMS have inbuilt capability to provide accessibility to affected and affected alarm details from a single point?		
8	Does the offered FMS have inbuilt		

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Sl. No	Parameter	Available – Yes/No	Particulars
	capability to collect alarm and fault data from devices and EMS/NMS systems and unified map, filter and process this data?		
9	Does the system support collection data over TL1, CMIP/Q3, CORBA and SNMP? Does it support original alarm data collection in modes of SYSLOG, SNMP TRAP and probe?		
10	Does the offered FMS have inbuilt capability to convert alarm information in different data and information formats into a unified format?		
11	Does the offered FMS have high performance engine to meet requirement of integrated alarm system, and can guarantee normal running when event storm occurs. Please provide details of any benchmarks if available.		
12	Does the system support the original redundancy fault information compression and centralized alarm information processing and be able to consolidate the repetitive alarm events?		
13	Does the system provide APIs so that various scripts and small tools		

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Sl. No	Parameter	Available – Yes/No	Particulars
	can be developed and executed to enhance the system functions?		
14	Can the system display alarms collected from EMSs over a network topology?		
15	No of users configurable in the offered system to allow to operate the system at the same time?		
16	No of current alarms (active alarms) can be handled at the same time?		
17	Does the system provide the topology map view from a single central console?		
18	Does the system provide network asset inventory reports and SLA reporting for the managed network infrastructure?		
19	Does the system have the capability to integrate with & switchover across Primary / Secondary EMS/NMS Servers		
20	Does the system have the capability to detect session failures and take care of re-establishment of alarms for EMS/NMS and non-EMS/NMS data collection		
21	Does the system have the capability to do resynchronization of the alarms with the EMS/NMS for the period of session loss		

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Sl. No	Parameter	Available – Yes/No	Particulars
22	After successful session re-establishment with EMS/NMS and while resynchronization with EMS/NMS is in progress, Does the system have the capability handle both the resynch alarm list and the real-time alarms together and still assuring the sequencing and ordering of the alarms from the network		
23	Does the system have the capability to handle the alarms on objects that are still not discovered and associate them with the inventory as soon as it gets discovered without dropping such events		
24	Does the system have the capability to handle changes in the TX Circuit inventory (Labels of the NEs, Route of the Circuits) etc during the lifetime of an alarm and recompute the RCAs & SIAs accordingly		
25	Does the system have the capability to handle the flap in the network ie., it is possible that a same alarm may flap (continuous raise & clear within a short time), so instead of reporting multiple events, they can be grouped as a		

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Sl. No	Parameter	Available – Yes/No	Particulars
	single and increment the flap counts based on a configurable duration.		
26	Does the system have the capability to enrich and display the properties (like alarmed object properties etc) in addition to the basic properties of alarms (like alarm name time etc) in the presentation view.		
27	Does the system have the capability to provide comments as part of alarm acknowledgement		
28	Does the System have the capability to identify the noise alarms (Ports / NEs / Cards that malfunctioning and flooding false alarms) from the network by correlating flap count and user-defined Threshold rules and filter the same automatically?		
29	Does the system have the capability to define Vendor Agnostic Standard Alarm to name to an alarm that depicts and network failure and allow the user to map all the similar alarms of different vendors against the same Standard name? e.g. System to allow definition of an Standard name as SPI_LOS which reflects		

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Sl. No	Parameter	Available – Yes/No	Particulars
	the network failure : Absence of Optical Signal / Power on the SDH Physical Interface Rx. System shall also allow user to map the alarm with native probable cause 'LOSS_OF_SIGNAL' from vendor-1 and the alarm with native probable cause as LOS from vendor 2 to be mapped to the same		
30	Does system have feature to suppress events (e.g unknown alarms in TX network or event storm in IP network)?		
31	Does the system have capability to configure rules for root cause analysis?		
32	Does the system have capability to correlate performance threshold alarms such as packet loss, jitter, and delay with Inventory Model?		
33	Does the system capable of having planned event (maintenance state) during which appropriate alarms are suppressed?		
34	Does the system capable of computing What-if-Analysis for Planned Events?		
35	Can the system support What-if-Analysis with current state of the network?		
36	Can the system support multiple		

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Sl. No	Parameter	Available – Yes/No	Particulars
	What-if-Analysis sessions simultaneously? Please specify number of sessions supported.		

C. Root Cause Analysis, Alarm Correlation & Impact Analysis

Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			
Version #:			
Function of the software:			
1	Does the system have the capability to abstract all network alarms related to a network failure and identify and report only the Root Cause Failure to the user by correlating all the effect alarms to the Root Alarm / failure		
2	Does the system has the capability to analyse the alarms from the network and correlate them with required inventory data to derive & detect the Root Cause failures in the Network which includes but not limited to a. Site Isolation b. Node Isolation c. Node Unreachable d. Card Failure e. Port Out Failure (TX Fail) f. Link Failure		

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Sl. No	Parameter	Available – Yes/No	Particulars
	g. Third Party Hand-Off Failure h. Cable Failure i. Infra Failure Alarms j. Ring Isolation k. Single Point of Failure (Links, Cable, Ducts, Trenches etc) l. Power Failure m. State Constituents Hand-off Port failure n. Protocol Failures (BGP, ISIS, OSPF) such as Area Isolation, Router Isolation, AS Isolation o. VLAN Path failures, Ethernet Ring Failures p. RTU failure		
3	Does the system have the capability to identify the Root Cause failures & Impact Analysis in the network across the various transmission technologies such as a. SDH b. L1 EoSDH c. L2 EoSDH d. Ethernet e. MPLS-TP / PTN f. DWDM/CWDM g. OTN h. MPLS/IP		

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Sl. No	Parameter	Available – Yes/No	Particulars
	i. any other		
4	Does the system have the capability co-relate the root cause alarms/errors with its corresponding remote indicators ie., the LOS alarm will be correlated with the RDI		
5	Does the system have the capability to co-relate the parent alarm with its corresponding downstream propagated alarms example:- Optical-LOS shall be correlated with the corresponding AU/TU/VC-AIS		
6	Does the system have the capability to identify and report the Network Impact, i.e. the network objects such Ports, Links / Bearer circuits, rings that are affected due to a network failure		
7	Does the system have the capability to identify and report the Service Impact, i.e. circuits / services delivered to the internal / external customer network that are affected due to a network failure		
8	Does the system have capability to handle the various protection mechanisms in accurately identifying the impact which includes but not limited to		

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Sl. No	Parameter	Available – Yes/No	Particulars
	a. SNCP b. DNI c. DRI d. ASON e. MSP 1+1 f. MSP 1:1 g. MSP 1:N h. 2-Fiber MSSP i. 4-Fiber MSSP j. OCH 1:1 k. Optical Splitter/Coupler Protection l. Nested Protection m. ASON n. MPLS-TP/PTN Tunnel Protection o. MPLS-E p. HSRP, VRRP Protection q. LAG, Multilink r. Primary/Backup APS, Multilink		
9	Does the system have the capability to detect the Service impact for End Ethernet Port & VCG Port failures in case of Services delivered over L1/L2 EoSDH / MPLS-TP / PTN		
10	Does the system have capability correlate Protocol and Tunnel Events with Network and Customer Services?		

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Sl. No	Parameter	Available – Yes/No	Particulars
11	Does the system have capability to compute QoS Alarms on Packet Loss, Jitter, Delay on Services?		
12	Does the system have capability to Identify the Service Impacts for Root Cause Events for Transit and Peering Services?		
13	Does the system have capability to Identify the Service Impacts for Root Cause Events for VPLS, L2 VPN, L3 VPN services?		

D. Views, Presentation & Reports

Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			
Version #:			
Function of the software:			
1	Does the system have the capability to display the Alarms / RCAs & SIA to the user in real-time without the need for manual/auto-periodic refresh in thick client & auto-refresh in web client?		
2	Does the system allow users to apply simple or complex filters over the real-time alarm views to narrow down the resultant data to view?		

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Sl. No	Parameter	Available – Yes/No	Particulars
3	Does the system allow the user to save such Search criteria as profiles so that users will be able to navigate across various such filters?		
4	Does the system have the capability to open multiple filtered views / tabs to enable users to have a real-time view of alarms pertaining to different user defined filtered criteria simultaneously?		
5	Does the system have the capability to allow the user to search across the history of the alarms received from the network along with the alarm properties?		
6	Does the system have the capability to allow the user to search across the history of the RCAs along with its properties?		
7	Does the system allow the user to view the impact (NIA & SIA) of a past RCA from the history?		
8	Does the system allow the user to Search the history of Service Impacts and to view the RCA of that service from the past history?		
9	Does the system have the capability to represent the End to End circuit in Graphical representation?		

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Sl. No	Parameter	Available – Yes/No	Particulars
10	Does the system have the capability to represent the circuits in the hierarchical graphical form with abstraction across various layers like SDH / WDM / OTN EoSDH / MPLS-TP/IP-MPLS?		
11	Does the system have the capability to represent the Ethernet Service layer to show only Eth & VCG Ports & VLAN Config etc abstracting the TDM Route and further allow the user to drill down to view the detailed TDM Route & data of the member circuits?		
12			
13	Does the system have the capability to super-impose the failures / Root Causes over the Graphical path of the circuit views to pin-point the failure segments in a circuit view?		
14	Does the system provide views with Network L2/L3 Topology with automatic NE layout with most easy to read hierarchy?		
15	Does the system provide views for Service topology for complex service networks such as L3 VPN, L2 VPN, MPLS-TE, L2 Network?		
16	Does the system provide views for NE level summary alarms?		

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E. Auto-Discovery & Inventory Management System:

Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			
Version #:			
Function of the software:			
1	Does the offered system gather descriptive information about the current configuration of the equipment, provide operator displays and prepare reports?		
2	Does the inventory management module have inbuilt capability to indicate complete view of the network elements and interconnecting links?		
3	Does the inventory management module have inbuilt capability to track any change in network inventory and report chronologically?		
4	Does the inventory management module generate report based on query e.g. module type, network element location etc.? Please provide details of available predefined reports.		
5	Does the system have the capability to automatically discover the network objects and their details? This should include		

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Sl. No	Parameter	Available – Yes/No	Particulars
	but not limited to a. Network Elements b. Hardware Inventory (Cards, Modules, SFPs etc) c. Ports d. Links e. Circuits /Trails / Cross-Connects f. Protection Information (MSP, MSSP, Ethernet LPG, LAG, Primary/Backup APS, Multilink, HSRP, VRRP) g. Ethernet VSI Mappings		
6	Does the system have the capability to stitch the end to end shape of the circuits traversing across Vendor technology boundaries?		
7	Does the system have the capability to model and store the inventory (Physical & Logical) as mentioned above?		
8	Does the system have the capability to reconcile the discovered data with the already stored data in the system and update the delta changes into the system?		
9	Does the system have the capability to discover customer		

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Sl. No	Parameter	Available – Yes/No	Particulars
	service end-to-end for IP/MPLS VPN services?		
10	Does the system have capability to discover QoS configured in the system and associated to interfaces?		
11	Does the System support discovery process based on the CPU threshold of router/switches?		
12	Does the system support discovery of MPLS L3 VPN and Pseudowires, VRF/VC/Tunnels, VLAN, QoS, policies?		
13	Does the system support the user to configure CLI, SNMP and EMS/NMS credentials to discover the network?		
14	Does the system allow to configure blackout to prevent discovery from network in the peak or planed activity time?		
15	Does the system allow the user to search based on device, interface, VLAN, IP address, VRF (Virtual Routing & Forwarding)?		
16	Is the offered system capable of managing physical and logical inventory of managed devices?		

F. Provisioning Management System:

Place:

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Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			
Version #:			
Function of the software:			
1	Does the offered system provide a single point of provisioning platform to handle end-to-end service provisioning (across the Core, aggregation and access)?		
2	Is the system capable of configuring the physical and logical connections of the core, aggregation and access?		
3	Does the system support automatic allocation of End Points, IP address & VLAN resources?		
4	Does the system support manual anchoring of the resources – hand-off ports / time-slots?		
5	Does the system support rules based auto-allocation of the resources, such as User circuits through specified HO Pipes and Internal Circuits through specific HO Pipes?		
6	Does the system have the capability to reserve the route and resources allocated to a circuit for a defined time and release them after expiry of the time?		
7	Does the system have the		

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Sl. No	Parameter	Available – Yes/No	Particulars
	capability to do bulk provisioning of circuits?		
8	Does the system have the capability to integrate with the underlying EMS/NMS NBI and send activation/deactivation commands?		
9	Does the system have the capability to integrate with the underlying EMS/NMS NBI or to the set of devices using CLI(SSH/Telnet) and send activation/deactivation commands?		
10	Does the system have the capability to generate work-orders for manual activation of the circuits in the network?		
11	Does the system support delayed scheduled activation of the circuits?		
12	Does the system provide report of all circuits provisioned and activated Does the system provide pictorial representation of the provisioned circuit?		
13	Does the system provide workflow for order execution ?		
14	Does the system provide search feature for seeing provisioning		

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Sl. No	Parameter	Available – Yes/No	Particulars
	details basis Task/ /service/circuit?		

G. Performance Management System:

Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			
Version #:			
Function of the software:			
1	Does the offered system provide a feature for operator to initiate, collect, and terminate performance metrics under both normal and degraded conditions?		
2	What period (months/days) of performance history is maintained by the system?		
3	Does the offered system monitor point to point & end to end signal quality and history for individual circuits/ LSP's?		
4	Does the system provide operator controls to monitor performance of specified events, measures, and resources?		
5	Does the system have multi tier architecture? If yes, provide details of the system architecture,		
6	Does the offered system monitor the performance and QoS of the		

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Sl. No	Parameter	Available – Yes/No	Particulars
	customer, and then produce reports according to the monitoring data?		
7	Does the offered performance management system collect and report the following SLA parameters: ▪ Packet delay and packet loss ratio ▪ Link usage rate of the operator ▪ User bandwidth usage rate ▪ Network availability rate ▪ CPU usage rate ▪ Input/Output traffic through physical ports ▪ Input/Output traffic through logical ports ▪ Amount and type of unused resources in the network ▪ Laser Module Temperatures, Optical Tx/Rx Power, Laser Bias Current		
8	Does the system provide a feature to configure the frequency of data collection from network devices or EMSs/NMSs?		
9	Does the system maintain the raw data and aggregated data in one database for future reporting or data input for other applications? Does the system provide manual dump or auto dump feature?		

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Sl. No	Parameter	Available – Yes/No	Particulars
10	Does the offered system provide feature of generating service performance reports for every User and provide customized services tailored to each User?		
11	Does the offered system provide flexible report generation feature in flexible formats, and with formula to analyze collected data customizable?		
12	Does the system provide different report templates for different levels of personnel e.g. system admin, User, etc? Can the system administrator reconfigure the report templates and content of the report?		
13	Does the offered performance management system provide diversified expression modes such as diagram, histogram, pie chart and table?		
14	Does the offered system provide feature to report traffic changes (including traffic of the entire network, traffic of a certain device, link utilization, type of service and application type)?		
15	Does the offered system monitor the network performance threshold based on the SLA, and report		

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Name.....

Designation.....

Sl. No	Parameter	Available – Yes/No	Particulars
	alarms in the case of threshold-crossing? Does the SLA support low and high thresholds? Does the SLA support time window before raising Alarm for threshold violations to avoid unnecessary escalations?		
16	Does the offered system provide a GUI to import, edit and browse the new MIB, to establish new rules, to generate performance reports for newly added devices and to modify and customize new reports?		
17	Does the offered system provide a centralized API for mass data extraction, like XML or SQL form so as to integrate with other information sources (such as the NE management system or other devices not supporting the SNMP)?		
18	Does the offered system provide inbuilt feature of computation and aggregation of KPI and KQI metrics indicative of the quality of service (QoS) and exception count for various services and applications delivered over the IP/MPLS infrastructure?		

Place:

Seal

Signature.....

Name.....

Designation.....

Sl. No	Parameter	Available – Yes/No	Particulars
19	Does the offered system have inbuilt feature to derive KPI and KQI metrics from performance statistics, fault management data and xDR data collected from the EMS/NMS? Does it also support derivation of KPI and KQI metrics from additional sources of service performance data instrumented within the network such as signalling probes or test systems?		
20	Does the offered system provide inbuilt feature of correlation and aggregation of service performance metrics from multiple sources?		
21	Does the offered system have inbuilt feature to populate resource models using inventory data obtained for EMS/NMS?		
22	Does the offered system have inbuilt support for representation of the relationships between logical and physical network resources and the subscriber services supported by those resources?		
23	Does the offered system provide inbuilt feature of monitoring defined thresholds of KPI/KQI metrics and generate alarm		

Place:

Seal

Signature.....

Name.....

Designation.....

Sl. No	Parameter	Available – Yes/No	Particulars
	notifications when thresholds are violated?		
24	Does the offered system have inbuilt feature of providing root cause analysis of QoS violations through drill down feature?		
25	Does the offered system have inbuilt feature of historical reporting of KQI and KPI metric data?		
26	Does the offered system have inbuilt capability of monitoring of service availability and QoS through near real-time dynamically updated dashboard views?		
27	Does the offered system come with inbuilt features of seamless bi-directional integration to helpdesk or trouble ticketing system? Please provide details of supported interfaces.		
28	Does the offered system provide many graphing methods such as time-series charts, Tables, Bar/Pie and other formats?		
29	Does the offered system provide summary performance data views from which drilled down can be performed to the detailed collected data level?		

Place:

Seal

Signature.....

Name.....

Designation.....

Sl. No	Parameter	Available – Yes/No	Particulars
30	Does the offered system provide Real-time Dash board views?		
31	Does the offered system provide top and bottom N reports?		
32	Can the offered system provide views of performance data against customer services?		
33	Can the offered system provide summarization such as 95 th Percentile for individual and group of IP interfaces?		
34	Can the offered system do predictive computation for the important performance data?		
35	Can the offered system do threshold computation on the predictive computed performance data?		

H. Unified NMS Console

Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			
Version #:			
Function of the software:			
1	Does the offered system has the capability to provide single presentation layer across fulfilment and assurance stack?		
2	Can the offered system integrate on standard protocols/APIs with		

Place:

Seal

Signature.....

Name.....

Designation.....

	multi party U-NMS/other CC and related systems for common presentation layer?		
3	Is the offered system fully compatible with different types of mobile/handheld/tablet devices offering functionalities of Dashboard, Reports, Tickets, and Alarms? Can the mobile/handheld views be customized to meet specific end user requirements?		

I. Trouble Ticketing System:

Sl. No	Parameter	Available – Yes/No	Particulars
Manufacturer:			
Version #:			
Function of the software:			
1	Does the offered system support Configurable rules like routing and auto assigning?		
2	Does the offered system provide the ability to define priority, severity and impact for the tickets?		
3	Is the offered system web based ITIL(IT Infrastructure Library) certified ?		
4	Does the offered system support export of data to XLS or PDF and any other required format?		
5	Does the offered system support Email		

Place:

Seal

Signature.....

Name.....

Designation.....

	communication and Message Board on the Portal part?		

Place:

Seal

Signature.....

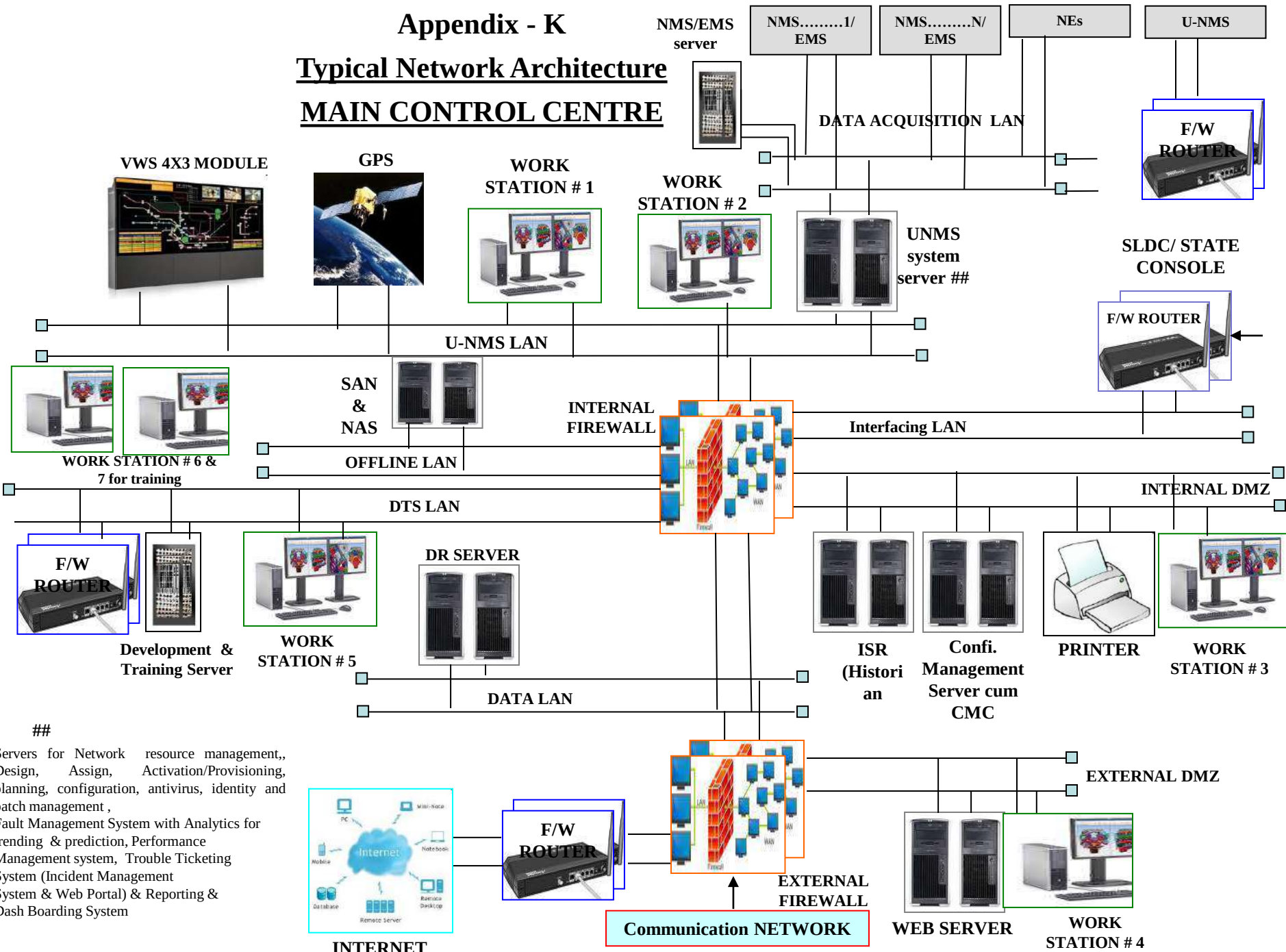
Name.....

Designation.....

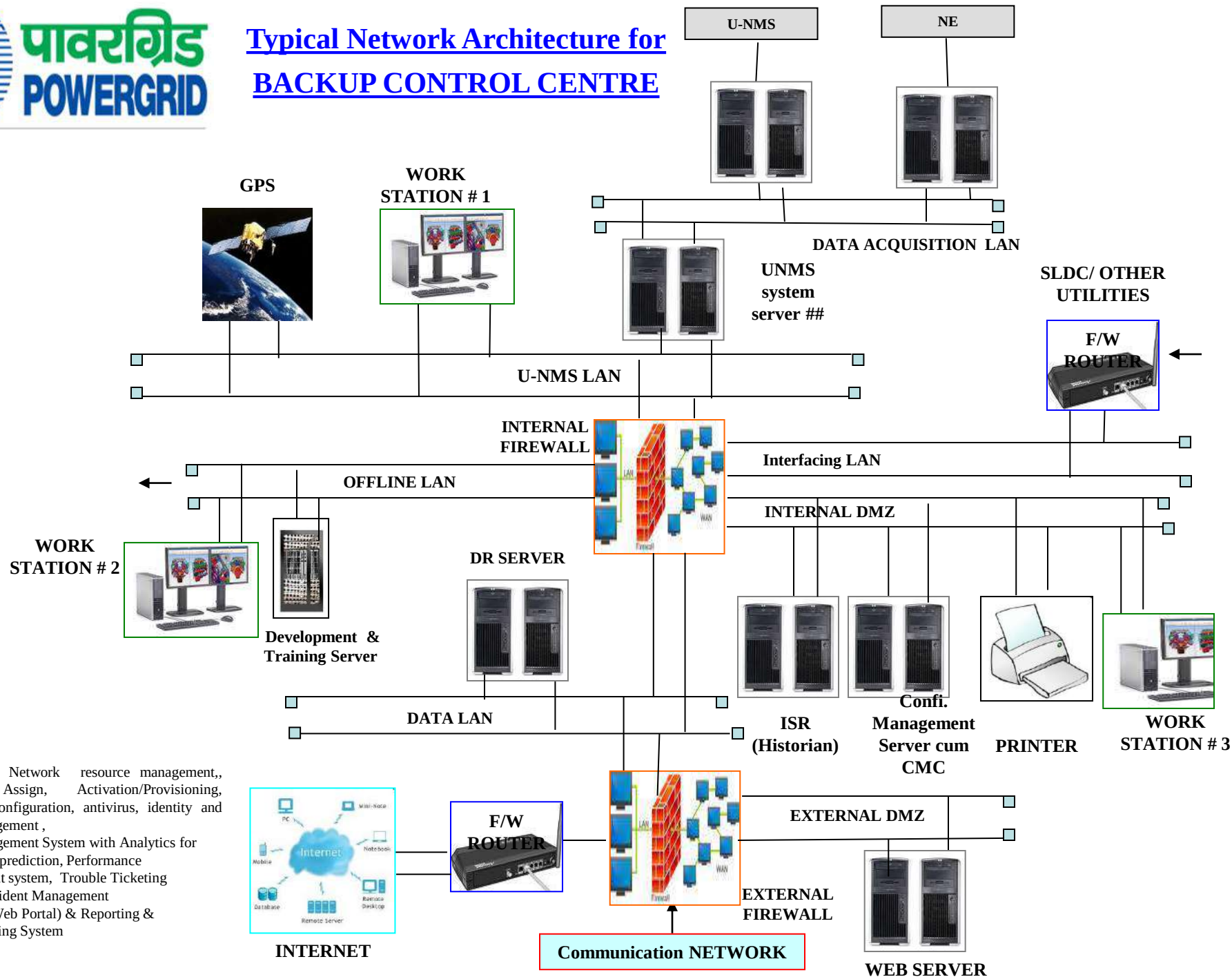
Appendix - K

Typical Network Architecture

MAIN CONTROL CENTRE



Typical Network Architecture for BACKUP CONTROL CENTRE



Servers for Network resource management,, Design, Assign, Activation/Provisioning, planning, configuration, antivirus, identity and patch management , Fault Management System with Analytics for trending & prediction, Performance Management system, Trouble Ticketing System (Incident Management System & Web Portal) & Reporting & Dash Boarding System

QUALIFICATION REQUIREMENT FOR**Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).****(Qualifying Requirement Data)****Bidders Name & Address:**

To,

.....

Corporate Contract Services,
 Power Grid Corporation of India Ltd.,
 'Saudamini', Sector - 29,
 Gurgaon, Haryana - 122001.

Dear Ladies and/or Gentlemen,

In support of the Qualification Requirements (QR) for bidders, stipulated in Annexure-A (BDS) of the Section - III (BDS), Volume-I & additional information required as per ITB clause 9.3(c) of the Bidding Documents, we furnish herewith our QR data/details/documents etc., alongwith other information, as follows (*The QR stipulations have been reproduced in italics for ready reference, however, in case of any discrepancy the QR as given in BDS shall prevail*).

We have submitted bid as individual firm.

We are furnishing the following details/document in support of Qualifying requirement for the subject package.

A. Attached copies of original documents defining:

- a) The constitution or legal status;
- b) The principal place of business;
- c) The place of incorporation (for bidders who are corporations); or the place of registration and the nationality of the Owners (for applicants who are partnerships or individually-owned firms).

B. Attached original & copies of the following documents.

- a) Written power of attorney of the signatory of the Bid to commit the bidder.

1.0 General Information

[The information in this form is to be completed for individual firms]

Where the Bidder proposes to use named subcontractor(s) for critical components of the works or for work contents in excess of 10 percent of the bid price, the following information should also be furnished for the subcontractor(s)].

Sl. No.	Particulars	For Individual Firm

Sl. No.	Particulars	For Individual Firm
1.	Name of the Firm	
2.	Head Office/ Registered Office Address	
3.	Telephone	
4.	Fax	
5.	Contact Person	
6.	Place of Incorporation/ Registration	
7.	Year of Incorporation/ Registration	
8.	Nationality of	
	Owner (i)	
	Owner (ii)	
	Owner (iii)	

(Necessary documents to establish legal status of the bidder should be enclosed with the bid).

2.0 Technical Requirements

2.1 (A) Bidder must have its own Unified Network Management System (UNMS)/Operational Support System (OSS) product and must have designed, supplied, installed, tested and commissioned at least two (02) nos. UNMS/OSS Projects in the last seven (7) years and at least one of the above projects must be in successful* operation for at least one (1) year as on **originally scheduled last date of bid submission (soft copy) i.e. 03/01/2024.**

2.1 (B) UNMS Product in each of the above projects must have following:

- a. Integration with Management System (EMS/NMS) of either of the transmission technologies SDH/PDH/DWDM/CWDM/MPLS/GPON/PTN/ASON of at least two (2) OEMs and 500 Network Elements (NEs)
- b. Implementation of following functionalities
 - (i) Fault Management & Route Cause Analysis (RCA)
 - (ii) Performance Management
 - (iii) Consolidated Reporting & Dash Boarding

2.2 A Bidder not meeting the requirement stipulated at 2.1 above can also be considered qualified provided that :

(A) The bidder must have installed, tested & commissioned at least one UNMS/OSS project meeting the requirements at 2.1(B) as a prime contractor# in the last seven (7) years which must be in successful* operation for at least one (1) year as on originally scheduled last date of bid submission (soft copy) mentioned above.

And

(B) The bidder must have an association with a firm who has its own UNMS/OSS product which have been installed & commissioned in at least two (2) UNMS/OSS project in the last seven (7) years meeting the requirement mentioned at 2.1(B) above and of which at least one project is in successful* operation for at least one (1) year as on originally scheduled last date of bid submission (soft copy) mentioned above. The Bidder shall furnish a joint deed of undertaking executed by him and his associate for the successful performance of the entire system as per the format specified in Section – VI: Sample Forms and Procedures, of the Bidding Documents along with additional Contract Performance Guarantee equivalent to 10% of the Ex-works cost of UNMS from the associate firm whose product is being offered.

In case, the bidder is a holding company, the technical experience referred to in clause 2.1 & 2.2 above shall be of that holding company only (i.e. excluding its subsidiary/ group companies). In case bidder is a subsidiary of a holding company, the technical experience referred to in clause 2.1 & 2.2 above shall be of that subsidiary company only (i.e. excluding its holding company).

Note-1 (*): Successful operation means Certificate issued by the Employer (an end user) certifying the operation without any adverse remark.

Note-2 (#): In case of works executed under a contract that had been awarded on a Joint Venture, the experience of individual Joint Venture partner shall be considered limited to the scope of that partner under the said contract.

2.3 On a separate page, using the following format, Bidder is requested to furnish the details of the previous experience, on the basis of which the Bidder wishes to qualify, as detailed at para 2.1 & 2.2 above. The information is to be summarised using following formats, as applicable, for each previous experience of the Bidder.

(Documentary evidence, such as copies of utility certificates etc., in support of its experience shall be attached with the filled-up format for each experience/Contract)

Format A Format for the Bidder (in support of meeting the requirement of para 2.1 of Annexure-A (BDS), Conditions of Contract, Volume-I of the bidding documents) is also to be furnished, as applicable, using this format

Name of the Bidder		
A1.	Name of Contract:	
A2.	Contract Reference No. & Date of Award	
A3.	Whether bidder have its own Unified Network Management System (UNMS)/Operational Support System (OSS) product	☐ Yes ☐ No (Tick only whichever is applicable)

A4.	Whether bidder have designed, supplied, installed, tested and commissioned at least two (02) nos. UNMS/OSS Projects in the last seven (7) years	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>	
A5.	Name of the Projects		
A6.	Name and Address of the Employer/Utility by whom the Contract was awarded e-mail ID Telephone No. Fax No.	_____ _____ _____	_____ _____ _____
A7.	Date of successful commissioning of above UNMS/OSS Projects No. of years the above referred project is in satisfactory operation as on originally scheduled last date of bid submission (soft copy)	_____ _____years	_____ _____years
A8.	Whether the project is in successful operation for atleast one (1) year as on originally scheduled last date of bid submission (soft copy)	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>
A9.	Whether UNMS product in each of the projects have following: a. Integration with Management System (EMS/NMS) of either of the transmission technologies SDH/PDH/DWDM/CWDM/MPLS/GPON/PTN/ASON of at least two (2) OEMs and 500 Network Elements (NEs) b. Implementation of following functionalities (i) Fault Management & Route Cause Analysis (RCA) (ii) Performance Management (iii) Consolidated Reporting & Dash Boarding	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i> ☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i> ☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>
A10	Details/documentary evidence submitted in support of stated experience/Contract		

(Use separate sheet for each experience / Contract)

Format B Format for the Bidder (in support of meeting the requirement of para 2.2 of Annexure-A (BDS), Conditions of Contract, Volume-I of the bidding documents), as applicable

Name of the Bidder		
A1.	Whether bidder have installed, tested & commissioned at least one UNMS/OSS project meeting the requirement at 2.1(B) of Technical Requirement above as a prime contractor in the last 7 years.	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>
A2.	Name of Contract:	
A3.	Contract Reference No. & Date of Award	
A4.	Name and Address of the Employer/Utility by whom the Contract was awarded e-mail ID _____ Telephone No. _____ Fax No. _____	
A5.	Date of commissioning of the project	
A6(i)	Whether the above UNMS/OSS project is in successful operation as on originally scheduled last date of bid submission (soft copy).	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>
(ii)	No. of years of successful operation as on originally scheduled last date of bid submission (soft copy).	_____
A7.	Whether bidder have an association with a firm who has its own UNMS/OSS product	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i> If, Yes. Please indicate the name of the Associate Firm: _____

A8.	Whether the Associate Firm has installed & commissioned at least two (2) UNMS/OSS project in the last seven (7) years meeting the requirement at 2.1(B) of Technical Requirement above	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>	
A9.	Name of Contract:		
A10.	Contract Reference No. & Date of Award		
A11.	Name and Address of the Employer/Utility by whom the Contract was awarded e-mail ID Telephone No. Fax No.	_____ _____ _____ _____	_____ _____ _____ _____
A12.	Date of commissioning of the project		
A13.	Whether the above UNMS/OSS project is in successful operation as on originally scheduled last date of bid submission (soft copy). No. of years of successful operation as on originally scheduled last date of bid submission (soft copy).	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i> _____years	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i> _____years
A14.	Whether UNMS product in each of the projects have following: a. Integration with Management System (EMS/NMS) of either of the transmission technologies SDH/PDH/DWDM/CWDM/MPLS/GPON/PTN/ASON of at least two (2) OEMs and 500 Network Elements (NEs) b. Implementation of following functionalities (i) Fault Management & Route Cause Analysis (RCA) (ii) Performance Management (iii) Consolidated Reporting & Dash Boarding	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i> ☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i> ☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>

A15.	Whether bidder alongwith the bid, has furnished a joint deed of undertaking executed by him and his associate for the successful performance of the entire system	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>
A15.	Details/ documentary evidence submitted in support of stated experience/ Contract	

3.0 Financial Position

(a) Net Worth of the Bidder for last 3 financial years should be positive.

(b) Minimum Average Annual Turnover #(MAAT) for the best three (3) years i.e. 36 months out of last five (5) financial years of the bidder should be at least **₹ 576.900 Millions**.

Note - "Annual gross revenue from operations/gross operating income as incorporated in the profit & loss account excluding other operative income/other income".

(c) Bidder shall have Liquid Assets (LA) or / and evidence of access to or availability of credit facilities of not less than **₹ 96.150 Millions**.

Note-1: In case, the bidder is a holding company, the financial experience referred to in clause 3.0 above shall be of that holding company only (i.e. excluding its subsidiary/ group companies). In case bidder is a subsidiary of a holding company, the financial experience referred to in clause 3.0 above shall be of that subsidiary company only (i.e. excluding its holding company).

Note-2: Relaxation for Start-Ups^/ MSEs

Start-Ups^/ MSEs, meeting the specified requirements at Para 3.0(a) above in Financial Position shall also be considered qualified if they meet Eighty (80) % of the requirement specified at Para 3.0 (b) & 3.0 (c) above in Financial Position.

^ Start-Ups as defined by DIPP, applicable as on the originally scheduled last date of bid submission (Soft copy)

3.1 In support of its 'Financial Position', in line with the above, the Bidder must provide the relevant information, alongwith documentary evidence, in the following formats A & B:

Name of the Bidder	
A. Turnover / Networth details: Whether the complete Annual Reports together with Audited Financial statement of Accounts/equivalent documents for the company for the FY of immediately preceding the date of submission of Bid are available?:	☐ Yes ☐ No <i>(Tick only whichever is applicable)</i>

Sl. No.	Financial year	Annual turnover in Rs. Crore	Networth in Rs Crore
1			
2			
3			
4			
5			
6			
	Average annual turnover for best three years out of last 5 years is:		

B. Liquid Assets	
Details of evidence of having Liquid assets (LA)	
Or	
Details of evidence of access to or availability of credit facilities	

5.0 *The Bidder shall also furnish following documents/details with its bid. {Reference ITB clause 9.3 (c)}*

5.1 *The complete annual reports together with Audited statement of accounts of the company for last five years of its own (separate) immediately preceding the date of submission of bid.*

Note:

- I. *In the event the bidder is not able to furnish the information of its own (i.e separate), being a subsidiary company and its accounts are being consolidated with its group/holding/parent company, the bidder should submit the audited balance sheets, income statements, other information pertaining to it only (not of its group/Holding/Parent Company) duly certified by any one of the authority [(i) Statutory Auditor of the bidder /(ii) Company Secretary of the bidder or (iii) A certified Public Accountant] certifying that such information/documents are based on the audited accounts as the case may be.*
- II. *Similarly, if the bidder happens to be a Group/Holding/Parent Company, the bidder should submit the above documents/information of its own (i.e. exclusive of its subsidiaries) duly certified by any one of the authority mentioned in Note-I above certifying that these information/documents are based on the audited accounts, as the case may be.*

5.2 The Bidder should accordingly also provide the following information/ documents:

Audited balance sheet and income statements for the last five years as per the following:

Years preceding to the bid opening	Audited Balance Sheet and Income Statements enclosed	
1 st Year	☐ Yes	☐ No
2 nd Year	☐ Yes	☐ No

3 rd Year	☐ Yes	☐ No
4 th Year	☐ Yes	☐ No
5 th Year	☐ Yes	☐ No

5.3

Whether bidder organisation is underway of Financial re-structuring. If Yes, please enclose the details of same and data/ documents establishing the same	☐ Yes ☐ No

Date:.....

Place:.....

(Signature) :.....

(Printed Name) :.....

(Designation) :.....

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830

(Manufacturer's Authorization Form)

(On Manufacturer's Letterhead, see Clause 9.3(c) of the ITB)

To: [Insert: name of Employer]

Dear Ladies and/or Gentlemen,

WE [insert: **name of Manufacturer**] who are established and reputable manufacturers of [insert: **name and/or description of the plant & equipment**] having production facilities at [insert: **address of factory**] do hereby authorize [insert: **name & address of Bidder**] (hereinafter, the "Bidder") to submit a bid, and subsequently negotiate and sign the Contract with you against IFB [insert: **title and reference number of Invitation for Bids**] including the above plant & equipment or other goods produced by us.

We hereby extend our full guarantee and warranty for the above specified plant & equipment materials or other goods offered supporting the supply, installation and achieving of Operational Acceptance of the plant by the Bidder against these Bidding Documents, and duly authorize said Bidder to act on our behalf in fulfilling these guarantee and warranty obligations. We also hereby declare that we and, [insert: **name of the Bidder**] have entered into a formal relationship in which, during the duration of the Contract (including warranty / defects liability) we, the Manufacturer or Producer, will make our technical and engineering staff fully available to the technical and engineering staff of the successful Bidder to assist that Bidder, on a reasonable and best effort basis, in the performance of all its obligations to the Purchaser under the Contract.

For and on behalf of the Manufacturer

Signed: _____

Date: _____

In the capacity of [insert: **title of position or other appropriate designation**] and this should be signed by a person having the power of attorney to legal bind the manufacturer.

Date:.....

Place:.....

(Signature).....
(Printed Name).....
(Designation).....
(Common Seal).....

Note 1. The letter of Undertaking should be on the letterhead of the Manufacturer and should be signed by a person competent and having Power of Attorney to legally bind the Manufacturer. It shall be included by the bidder in its bid.

2. Above undertaking shall be registered or notarized so as to be legally enforceable.

SAFETY PACT

Between

Power Grid Corporation of India Limited

having its Registered Office at B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110016

hereinafter referred to as

“POWERGRID”

and

[Insert the name of the Sole Bidder / Lead Partner of Joint Venture]

having its Registered Office at _____

[Insert full Address]

and

[Insert the name of the Partner(s) of Joint Venture, as applicable]

having its Registered Office at _____

[Insert full Address]

Hereinafter referred to as

“The Bidder/Contractor”

Preamble

POWERGRID intends to award, under laid-down organisational procedures, contract(s) for

[Insert the name of the package]

_____ Package and

Specification Number _____

[Insert Specification Number of the package]

POWERGRID values full compliance with all relevant laws and regulations and the principles of Safety, Health & Environment in its relations with its Bidders/ Contractors.

In order to achieve these goals, POWERGRID and the above named Bidder / Contractor enter into this agreement called **“Safety Pact”** which will form part of the Bid.

It is hereby agreed by and between the parties as under:

Section I – Commitments of POWERGRID:

POWERGRID commits itself to take all measures necessary to prevent accidents during Construction and Operation of the Transmission Assets and to observe the following:

1. POWERGRID recognizes and accepts its statutory responsibilities for ensuring construction, operation and maintenance of equipments and for the provision of safe methods of work and safe working conditions.
2. POWERGRID recognizes and accepts its statutory responsibilities for ensuring safety of not only its employees but also that of the Contracting Agencies as Principal Employer.
3. POWERGRID shall review the accidents in a structured manner and take necessary actions to ensure that the safety criteria are strengthened for safe construction as well as Operation & Maintenance of the Transmission Assets.
4. POWERGRID shall conduct necessary awareness and training programmes to its Employees to augment the various safety requirements to be followed during Construction and Operation & Maintenance of the Transmission Assets from time to time.
5. POWERGRID shall, from time to time, issue necessary guidelines, instructions and deterrents to its employees as well as to the Contracting Agencies, to update them to take necessary preventive measures to avoid repetition of similar accident attributes.
6. POWERGRID shall review and provide necessary guidance to the Contracting Agencies, as and when, any abnormality / special situations are brought to its notice by the Contracting Agencies during execution of the Transmission Projects being executed by them.
7. POWERGRID shall conduct periodical surveillance site inspections / audits to identify the unsafe conditions and unsafe actions, and bring them to the knowledge of the Contracting Agencies for taking timely corrective actions.
8. POWERGRID shall investigate all accidents, fatal as well as non-fatal, to identify the lapses, the reason for the accident / incident and suggest measures for prevention of recurrence of such accidents, and fix responsibility for the lapses leading to the accident.
9. POWERGRID shall augment the training to the workers and supervising personnel of the Contracting Agencies, as per schedules, upon nomination by the Contracting Agencies in reasonable time frame.
10. POWERGRID shall exercise the right to claim and recover compensation from the Contracting Agencies in case of any violation of the safety requirements / provisions during execution of the Transmission Projects, as built in the applicable Laws and contractual specifications / guidelines in vogue / issued by POWERGRID from time to time.

11. Section II – Commitments of the Bidder / Contractor:

The Bidder / Contractor commits himself to take all measures necessary to prevent / minimise accidents at their construction / erection sites and to observe the following:

1. The Bidder / Contractor recognizes and accepts the statutory and comprehensive responsibility for ensuring safe construction and Testing & Commissioning in the Transmission Projects being executed by them by providing safe methods of work, working conditions and Tools & Plants for human safety.

2. The Bidder / Contractor recognizes and accepts the responsibilities for ensuring safety of not only their employees but also that of the Sub-contractors, Principal Employer and the general public during execution of the Transmission Projects / works.
3. The Bidder / Contractor shall review the accidents in a structured manner and take necessary actions to ensure that the safety criteria are strengthened for safe construction of the Transmission Assets.
4. The Bidder / Contractor shall endeavour continuous development of safe methods of work to ensure that the effect of risks and perils are minimised to the extent possible and implement the same at their worksites.
5. The Bidder / Contractor shall conduct periodical Training to their Employees as well as to that of their Sub-contractors for safety awareness during construction works being executed by them.
6. The Bidder / Contractor shall provide all requisite Tools & Plants required for the work and ensure their healthiness by periodical inspections / testing as required. Unhealthy and sub-standard Tools & Plants will be immediately removed from site as and when they are identified.
7. The Bidder / Contractor shall, at their cost, provide all necessary Personal Protective Equipments such as Double Lanyard Safety Belts, Appropriate Fall Arrest Systems, Safety Helmets, Foot Wear, Hand Gloves, etc., as required for various activities pertaining to execution of the Projects / works, confirming to relevant Indian Standards.
8. The Bidder / Contractor shall ensure that dedicated qualified Safety Officers are posted in the construction projects being executed by them and ensure that the Safety Officer visits each and every gang periodically and conducts audits / inspections to identify the unsafe conditions and unsafe actions, to be rectified by the site supervising personnel promptly.
9. The Bidder / Contractor shall conduct appropriate medical checks-up for the workers before deploying them at their construction sites to ensure that only those who are medically fit are deployed in the Projects / works to be executed by them. The copy of the Medical Reports shall be provided by the Bidder / Contractor to POWERGRID, whenever requested by POWERGRID.
10. The Bidder / Contractor shall screen the workers before deploying them at their construction sites to ensure that only those with the skills, experience and competence to work at height and also medically fit for work at height are deployed for work at height in the Projects executed by them.
11. The Bidder / Contractor shall ensure daily before starting the work that their site Supervising Personnel / Safety Officer briefs the workers about the work for the day and the safety measures / precautions required to be taken by them.
12. The Bidder / Contractor shall investigate all the accidents at their working sites to ascertain the lapses leading to the incident and the precautionary / corrective measures required to be taken to avoid recurrence of such accidents. These accidents will be reviewed at the Board Management level of the Agencies and the findings / recommendations will be put up to POWERGRID Apex Safety Board within the stipulated period.
13. The Bidder / Contractor shall ensure that all accidents, whether fatal or non-fatal in nature, will be informed to POWERGRID, in writing, immediately on the occurrence of the same, and in any case, within not more than 24 hours of occurrence of the same.
14. The Bidder / Contractor shall ensure that in case of any accident, all necessary medical help / support shall be provided to the victims / injured till they are completely fit to return to work.
15. The Bidder / Contractor shall ensure that in case of fatal accidents, all statutory Authorities, including Police, concerned Labour Dept. Officials, concerned Workmen Compensation Commissioner, etc.,

will be intimated in writing as required by the statutory Law, and followed up for compliance of all statutory obligations. The Bidder / Contractor shall own full responsibility of timely accident reporting to various authorities, including POWERGRID.

16. The Bidder / Contractor shall ensure that in case of fatality or serious injury leading to permanent disablement of the victims, the compensation amount will be deposited with the concerned authorities, as required by the Laws, and followed up for early disbursement to the beneficiaries of the victims.
17. The Bidder / Contractor assures that they shall co-operate to the fullest extent for carrying out any investigation of the accidents at their work sites by POWERGRID to identify the lapses, the reason for the accident / incident and suggest measures for prevention of recurrence of such accidents. All factual details of the occurrence of the accident will be provided to POWERGRID, as and when required.
18. The Bidder / Contractor assures that they take full responsibility of meeting the statutory obligations in case of accidents, and in case of any reference by any Statutory Body at a later date also, they shall provide all information to POWERGRID and meet all the statutory obligations, including payment of additional compensation, if any.
19. The Bidder / Contractor assures that in case of any inspection of their work site or Notice by any Statutory Authority, they shall comply promptly and inform POWERGRID Site Officials of the same, and also provide all necessary information and assistance for smooth compliance of the observations / instructions of such Authorities.
20. The Bidder / Contractor accepts the provisions regarding safety, including payment of any sums to POWERGRID, in case of any violation of the safety requirements / provisions during execution of the Transmission Projects, as built in the Contractual Conditions, Safety Plan and the Safety Pact, and confirm to abide by the same.

Section III – Equal treatment to all Bidders / Contractors:

1. POWERGRID will enter into agreements with identical conditions as this one with all Bidders.
2. POWERGRID will disqualify, from the tender process, any bidder/ take punitive actions on the bidder, who does not sign this Pact or violate its provisions.

Section IV – Pact Duration:

This Pact begins when both parties have legally signed it. It expires for the successful Bidder / Contractor after closure of the contract and, for all other Bidders, after the contract has been awarded.

Section V – Other Provisions:

1. This agreement is subject to Indian Law. Place of performance and jurisdiction is the establishment of POWERGRID. The Arbitration/**Conciliation** clause provided in the main tender document / contract shall not be applicable for any issue / dispute arising under the Safety Pact.
2. Changes and supplements need to be made in writing, which shall come into force only upon mutual agreement / acceptance.

3. If the Contractor is a partnership firm or consortium of Joint Venture, this agreement must be signed by all partners, consortium members and Joint Venue partners, as applicable as per the Tender Specifications.
4. Nothing in this agreement shall affect the rights of the parties available under General Conditions of Contract (GCC) and Special Conditions of Contract (SCC).
5. Should one or several provisions of this agreement turn out to be invalid, the reminder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(Signature)_____

(For & on behalf of POWERGRID)

(Signature)_____

**(For & on behalf of Bidder / Partner(s) of Joint
Venture / Contractor)**

(Office Seal)

(Office Seal)

Name:_____

Name:_____

Designation:_____

Designation:_____

Witness 1:_____

Witness 1:_____

(Name & Address)_____

(Name & Address)_____

Witness 2:_____

Witness 2:_____

(Name & Address)_____

(Name & Address)_____

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830.

(Declaration of Key Managerial Person and Power of Attorney holder)

Bidder's Name and Address:

To: Power Grid Corporation of India Ltd.
"Saudamini", Plot No.2, Sector-29,
Gurgaon, Haryana - 122 001

Dear Sir,

1. We confirm that the declarations made in our bid, particularly Attachment-3 (QR) regarding eligibility/qualification data and documents submitted in our bid in support of the declarations, are true and correct to the best of our knowledge.
2. We further confirm that we have filled up Attachment-3(QR). We also confirm that in support of meeting the Technical experience requirement as per Annexure-A (BDS), we have enclosed self-certified copy of Contract/ Award Letter and certificate from the utility for which the contract has been executed.
3. We shall furnish clarification to bid, if any sought by Employer pursuant to ITB clause 21.1. We understand that if we fail to rectify/furnish the requested documents if any, within 7 working days' notice, our bid is liable to be rejected.
4. We understand that any false declaration and/or misrepresentation of facts and/or furnishing of false/forged documents /information may lead to our debarment from participation in Employer tenders and that our Bid Security/ Contract Performance Guarantee may be forfeited besides other actions as deemed to be appropriate as per the provisions of the Bidding Document/Integrity Pact/Employer's policy.
5. Notwithstanding above, we also understand that the Bid Capacity/Manufacturing Capacity as declared hereinabove, shall be subject to assessment, if any, by the Employer, which shall be final and binding. We also confirm that the Employer may verify the supporting documents/ details in connection with above declarations. We further understand that in case of any unethical practices inter-alia including any misrepresentation of facts, submission of false and/or forged details/ documents/ declaration by us, we may be debarred from the participation in Employer's tenders in future as considered appropriate by Employer and our Bid Security/ Contract Performance Guarantee shall be forfeited besides taking other actions as deemed appropriate.

Date:.....

Place:.....

(Signature of Power of Attorney holder).....

(Printed Name).....

(Designation).....

(Common Seal).....

(Signature of Key Managerial Person).....
(Printed Name).....
(Designation).....
(Common Seal).....

Note: Key Managerial Personnel (KMP) of the company shall include CEO/Managing Director/ Company Secretary/ Director/ CFO/any of the partner in case of partnership firm/any other officer entrusted with substantial powers of the management of the affairs of the company/firm.

**Package-I: Unified Network Management System (U-NMS) for Central Sector & State
Sector Communication in Western Region (WR)**

(Undertaking by the bidder regarding Compliance of DMI&SP policy)

Bidder's Name and Address :

To:

Contract Services

Name :

Power Grid Corporation of India Ltd.,

Address :

"Saudamini", Plot No. 2, Sector 29

Gurgaon (Haryana) - 122001

Dear Sir,

- 1.0 We have read and understood the provisions of *"Policy for providing preference to Domestically Manufactured Iron & Steel Products in Government Procurement"* (hereinafter **"DMI&SP policy"**) issued by Ministry of Steel, Government of India vide Notification dated 8th May 2017 and its revision dated 29th May 2019 and including subsequent amendments/ modifications, if any.
- 2.0 We undertake that we shall comply with the requirement of DMI&SP policy including its subsequent amendments issued from time to time. Further, we undertake that in case of award on us, the requisite Affidavit of self-certification regarding Domestic Value Addition and/or Authorization certificate from the domestic manufacturer/ supplier of iron and steel products (*whose HS codes are falling in Appendix-A of the DMI&SP policy as revised from time to time*) included in the BoQ/ scope of the package shall be submitted by us to Employer before supply of the said iron and steel products required under the contract.

Date :

Printed Name :

Place :

Designation :

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830.

Format for Affidavit of Self certification regarding Local Content in line with PPP-MII order, **MoP Order and DoT Order**, if applicable, to be provided on a non-judicial stamp paper of Rs. 100/-.

Date:

I _____ S/o, _____ D/o, _____ W/o, _____ Resident
of _____ hereby solemnly
affirm and declare as under:

That I will agree to abide by the terms and conditions of the Public Procurement (Preference to Make in India) Order, 2017 of Government of India issued vide Notification No:P-45021/2/2017 -BE-II dated 15/06/2017, its revision dated **16/09/2020** (hereinafter **PPP-MII order**), 'Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content)' order dated 16/11/2021 issued by Ministry of Power (hereinafter **MoP order**), Public Procurement (Preference to Make in India) Order, 2017- Notification of Telecom products, Services or Works (hereinafter, **DoT-Notification-August 2018**) issued vide Notification No. 18-10/2017-IP dated 29.08.2018 by Department of Telecommunications (DoT), Ministry of Communications, Government of India and any subsequent modifications/Amendments, if any and

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring entity/POWERGRID or any other Government authority for the purpose of assessing the local content of goods/services/works supplied by me for '**Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830**'.

That the local content for all inputs which constitute the said goods/services/works has been verified by me and I am responsible for the correctness of the claims made therein.

That the 'Local Content 'as defined in the PPP-MII order, MoP order and DoT Order in the goods/services/works supplied by me for (Enter the name of the package) is percent (%).

That the goods/services/works supplied by me for '**Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830**' meet the 'Local Content' requirement as defined in the PPP-MII order, **MoP order and DoT Order** for '**Class -I local supplier**'.

That the value addition for the purpose of meeting the 'Local Content 'has been made by me at (Enter the details of the location(s) at which value addition is made).

***In case of supply of Telecom Products/ Services/Works from an OEM/Supplier, I shall ensure 'Minimum Local Content 'as defined in the PPP-MII order and DoT-Notification-August 2018 in the Telecom Products/ Services/Works supplied from the OEM/Supplier.**

That in the event of the local content of the goods/services/works mentioned herein is found to be incorrect and not meeting the prescribed Local Content criteria, based on the assessment of procuring agency (ies)/POWERGRID/Government Authorities for the purpose of assessing the local content, action shall be taken against me in line with the PPP-MII order, **MoP order and DoT Order** and provisions of the Integrity pact/ Bidding Documents.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.

- i Name and details of the Local Supplier
(Registered Office, Manufacturing unit location, nature of legal entity)
- ii. Date on which this certificate is issued
- iii. Goods/services/works for which the certificate is produced
- iv. Procuring entity to whom the certificate is furnished
- v. Percentage of local content claimed and whether it meets the Local Content prescribed for '**Class -I local supplier**'.
- vi. Name and contact details of the unit of the Local Supplier (s)
- vii. Sale Price of the product

- viii Ex-Factory Price of the product
- ix. Freight, insurance and handling
- x. Total Bill of Material
- xi List and total cost value of input used to manufacture the Goods/to provide services/in construction of works
- xii. List and total cost of input which are domestically sourced. Value addition certificates from suppliers, if the input is not in-house to be attached
- xiii. List and cost of inputs which are imported, directly or indirectly

For and on behalf of..... (Name of firm/entity)
Authorized signatory (To be duly authorized by the Board of Directors)
<Insert Name, Designation and Contact No.>

Certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content, in line with PPP-MII order, MoP Order and DoT order, if applicable *[to be submitted on the letter head of the issuer.]*

Dear Sir,

We have read and understood the provisions of "Public Procurement (Preference to Make in India) Order, 2017" dated 15/06/2017, its revision dated 16/09/2020 [hereinafter, "PPP-MII Order"] issued by **Department for promotion of Industry and Internal Trade (DPIIT)**, Ministry of Commerce and Industry, Government of India, 'Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content)' order dated 16/11/2021 issued by Ministry of Power [hereinafter, "MoP order"] and Public Procurement (Preference to Make in India) Order, 2017- Notification of Telecom products, Services or Works (hereinafter, DoT Order) issued vide Notification No. 18-10/2017-IP dated 29.08.2018 by Department of Telecommunications (DoT), Ministry of Communications, Government of India and any subsequent modifications/Amendments, if any.

In line with the provisions of the PPP-MII Order, MoP Order and DoT Order, M/s. *[Enter the name of the Bidder]* [hereinafter, "Class-I Local Supplier"/"Class-II Local Supplier"] (*choose as applicable*) have submitted an Affidavit of self-certification to M/s. Power Grid Corporation of India Limited [hereinafter, POWERGRID] regarding Local Content in Goods/Services/Works to be supplied by the "Class-I Local Supplier" for 'Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830', wherein they have agreed to abide by the terms and conditions of the PPP-MII Order, MoP Order and DoT Order.

Further, in line with the PPP-MII Order, the statutory auditor or cost auditor of the company (in the case of companies) or a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) shall provide a certificate giving the percentage of Local Content in the Goods/Service/Works to be supplied by the "Class-I Local Supplier" for 'Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830'.

Accordingly, we, the Statutory Auditor(s) / Cost auditor of the "Class-I Local Supplier" a practicing cost accountant or practicing chartered accountant *[choose as applicable]*, certify that the Local Content as defined under the PPP-MII, MoP Order and DoT Order, in the Goods/Service/Works to be supplied by the "Class-I Local Supplier" for 'Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830' is percentage *[specify the percentage of Local content]*.

For and on behalf of,

Date:

<<Statutory Auditor's/ Cost auditor's/ Cost accountant's/ Chartered accountant's attestation>>

Firm Reg No. Membership No.

Note: This is a guiding format. In case the bidder submits the certificate in a format different from the above, the same may be considered provided it meets the intent and purpose, as may be ascertained by POWERGRID.

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).**(Compliance to the process related to the e-RA Terms & Conditions and the Business Rules governing the e-RA)**

Bidder's Name and Address (Lead Partner) : To:
Contract Services
Name : Power Grid Corporation of India Ltd.,
Address : "Saudamini", Plot No. 2, Sector 29
Gurgaon (Haryana) - 122001

Dear Sir,

This has reference to the Terms & Conditions for the e-Reverse Auction mentioned in the Business Rules for 'Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR); Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830'.

We confirm that:

- 1) The undersigned is authorized representative of the **Bidder**.
- 2) We have studied the e-Reverse Auction Terms & Conditions and the Business Rules governing the e-Reverse Auction as mentioned in your letter and confirm our agreement to them.
- 3) We understand that **ASP** shall arrange to demonstrate/ train (if not trained earlier) bidders' nominated person(s), without any cost. They will also explain all the Rules related to e-Reverse Auction/ Business Rules Document to be adopted along with bid manual. We have further noticed that we at own discretion may ask for additional training to use the e-RA platform well in advance before start of the e-RA event by contacting the **ASP** at any suitable time. All such additional trainings shall also be free of cost.
- 4) We further re-confirm that within an hour of conclusion of e-Reverse Auction, we will submit confirmation of our final offered price in e-Reverse Auction including the break-up under individual head of the template [i.e. **CIF/Ex-works Price, Port handling & Custom clearance, Local Transportation, In-transit Insurance, loading and unloading, Installation Charges, Type Test Charges, Training Charges, Customs Duty, GST for supply of Goods and Installation Services etc., as applicable**] Further, unless other-wise stated in the above break-up, decrease in the price of individual head of the template shall be considered proportionately on all individual line items of the respective head of the price schedules. In case, there is any variation between our final price quoted in Reverse Auction and the signed document submitted by us after Auction, the first i.e. Closing Price in Auction, shall be taken as final offered price by us. We also confirm that we will not increase unit rate of any item submitted in our original bid.

We hereby confirm that we will honor the Bids placed by us during the auction process.

Date :

Printed Name:

Place :

Designation:

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).

(Declaration by the bidder regarding events encountered pursuant to ITB Clause 2.1 (In case of a Joint Venture bid, the declaration shall be given by all partners of the Joint Venture))

Bidder's Name and Address :**To:**

Contract Services

Name :

Power Grid Corporation of India Ltd.,

Address :

"Saudamini", Plot No. 2, Sector 29

Gurgaon (Haryana) - 122001

Dear Sir,

- 1.0 In accordance with the relevant provisions of the bidding documents inter-alia including for assessment of capacity and capability, we furnish herewith our data/details/documents along with other information, as follows

Sr. No.	Event		
1.	Whether there was Termination of Contract(s) due to Contractor's default	☐ ☐	Yes No
2.	Whether there was Encashment of CPG(s) due to non-performance	☐ ☐	Yes No
3.	Whether there was repeated failure of major Equipment(s) while in service*	☐ ☐	Yes No
4.	Whether substantial portion of works (<u>more than 50% of the Contract**</u>) is sub-contracted, under an existing Contract	☐ ☐	Yes No
5.	Whether more than 25% of the Contract price (awarded value), in aggregate, is paid to sub-contractors/suppliers as Direct payment, under an existing Contract, due to financial position of Contractor	☐ ☐	Yes No
6.	Firm has been referred to NCLT under Insolvency & Bankruptcy Code (<i>IRP has been appointed or Liquidation</i>)	☐ ☐	Yes@ No

Sr. No.	Event	
	<i>proceedings have been initiated under IBC)</i>	

Note:

1. *Information regarding events at Sl. No. 1 to 5 shall be furnished for events occurred during last one year under the contract(s) executed by you for POWERGRID (Owned as well as Consultancy)*
- *2. *In case POWERGRID has issued a letter in this regard wherein the firm has been put on hold from award of further contract(s) for a specified period and this specified period of hold is yet to expire, the bidder shall indicate "Yes" against this event.*
- **3. *For the purpose of working out 50% of the Contract, following shall be taken into account suitably:*
 - (a) *Scope of the contract which is permissible to be sub-contracted as per bidding documents, shall be excluded.*
 - (b) *Scope of the Contract which primarily relates to the Qualification Requirement (QR) of the bidder as illustrated below:*

Sl. No.	Type of Package/Contract	Main aspect of the QR	Criteria for working out 50% of the Contract
1.	Conductor/Insulator Package	Manufacture & Supply	50% of the total supply of Conductor/Insulator under the Contract
2.	Tower Package	Construction of Transmission Line	50% of the total Transmission Line construction under the Contract
3.	Substation(AIS) Package	Construction of bays	50% of the total bays construction under the Contract
4.	Transformer/Reactor	Manufacture & Supply	50% of the total supply of Transformer/Reactor under the Contract
5.	Substation(GIS) Package	Manufacture & Supply of GIS bays	50% of the total supply of GIS bays under the Contract

The guiding principles as illustrated above shall be followed while dealing with other packages/contracts.

- @4. *Regarding Sl. No. 6, in case of 'Yes', following information shall be submitted additionally:*

Date on which the firm has been referred to NCLT under Insolvency & Bankruptcy Code (IRP has been appointed or

Liquidation proceedings have been initiated under IBC)

.....

*Whether the process under IBC has been concluded
(If yes, supporting documents be submitted)*

☐ Yes
☐ No

- 2.0 We confirm that the above information/declarations and documents submitted in support of the same are true and correct to the best of our knowledge. We understand that any false declaration and/or misrepresentation of facts and/or false/forged documents/information may lead to our debarment from participation in Employer tenders and that our Bid Security/Contract Performance Guarantee may be forfeited besides other actions as deemed to be appropriate as per the provisions of the Bidding Documents/Integrity Pact/Employer's policy.

Date :

Place :

**Printed
Name :
Designation
:**

**Package-I: Unified Network Management System (U-NMS) for Central Sector &
State Sector Communication in Western Region (WR).**

Certification by the Bidder per order no. F.No.6/18/2019-PPD dated 23/07/2020 **and F.No.7/10/2021-PPD(1) dated 23/02/2023** issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India (DoE Order) in line with ITB 2.1

(In case of a Joint Venture bid, the declaration/ certification shall be given by all partners of the Joint Venture)

Bidder's Name and Address:

To:

Name:.....

Contract Services

Address:.....

Power Grid Corporation of India Limited,

.....

"Saudamini", Plot No: 2, Sector-29

Gurgaon (Haryana)

Dear Sir,

We have read and understood the provisions of Order no. F.No.6/18/2019-PPD (Order Public Procurement no.1) dated 23/07/2020 regarding "Restriction under Rule 144(xi) of General Financial Rules", F.No.6/18/2019-PPD (Order Public Procurement no.2) dated 23/07/2020 regarding "Exclusions from Restriction under Rule 144(xi) of General Financial Rules", **and F.No.7/10/2021-PPD(1) (Order Public Procurement no.4) dated 23/02/2023 regarding regarding "Restriction under Rule 144(xi) of General Financial Rules"** issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Government of India [hereinafter collectively "**DoE Order**"] and any subsequent modifications/ Amendments, if any.

Particularly, we, the Bidder, have read the clause regarding restrictions on procurement from a 'Bidder of a country which shares a land border with India', on sub-contracting to contractors from such countries, **[and on procurement from a bidder having Transfer of Technology (ToT) arrangement]**.**

We certify that we, the bidder is/are not from such a country or, if from such a country, has been registered as per provisions of the Bidding Documents with the Competent Authority and will not subcontract any work to a subcontractor/sub vendor from such countries unless such subcontractor/sub vendor fulfils all requirement in this regard and

is eligible to be considered. *[Where applicable, evidence of valid registration by the Competent Authority shall be attached.]*

****We certify that we, the bidder does not have any ToT arrangement requiring registration with competent authority.**

OR

We certify that we, the bidder has valid registration to participate in this procurement.

We further declare that any misrepresentation or submission of false/forged document/information in this regard shall be dealt with as per the provisions of Integrity Pact and/or Bidding Documents and/or POWERGRID's policy and procedures.

Date:

Printed Name:

Place:

Designation:

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).

Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830

Bid-Securing Declaration

[The Bidder shall fill in this Form in accordance with the instructions indicated.]

Date: *[date (as day, month and year)]*

Specification number: CC/NT/W-MISC/DOM/A06/23/11830

To: *[insert Name and Address of Employer]*

We, *[insert name of the Bidder]* understand that, according to bid conditions, Bids must be supported by a Bid-Securing Declaration.

We the Bidder hereby declare that, if we are in breach of any of our obligation(s) under the bidding conditions as brought out below, our bids for any package whose originally scheduled date of bid opening/actual date of bid opening (First Envelope or Second Envelope) falls within 1 year reckoned from the date of issuance of communication to this effect by the Employer, shall be considered non-responsive:

- (1) If we withdraw our bid during the period of bid validity specified by us in the Bid Form; or
- (2) In case we do not withdraw the deviations proposed by us, if any, at the cost of withdrawal stated by us in the bid and/or accept the withdrawals/rectifications pursuant to the declaration/confirmation made by us in Attachment – Declaration of the Bid; or
- (3) If we do not accept the corrections to arithmetical errors identified during preliminary evaluation of our bid pursuant to ITB Clause 27.2; or
- (4) If, as per the requirement of Qualification Requirements, we fail to submit a Deed of Joint Undertaking (duly attested by Notary Public of the place(s) of the respective executants (s) or registered with the Indian Embassy/High Commission in that Country) within ten days from the date of intimation of post – bid discussion; or
- (5) In the event of us being a successful Bidder, if we fail within the specified time limit
 - (i) To sign the Contract Agreement, in accordance with ITB Clause 34, or
 - (ii) To furnish the required performance security, in accordance with ITB Clause 35.or
- (6) In any other case specifically provided for in ITB.

Package-I: Unified Network Management System (U-NMS) for Central Sector & State Sector Communication in Western Region (WR).
Spec. No.: CC/NT/W-MISC/DOM/A06/23/11830

Name of the Bidder* _____

Name of the person duly authorized to sign the Bid on behalf of the Bidder** _____

Title of the person signing the Bid _____

Signature of the person named above _____

Date signed _____ day of _____, _____

*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

**: Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members to the Joint Venture that submits the Bid.]

LEGENDS

Service Unit Description		
S.No	Legend	Description
1	B50	BAG PER 50 KG OF CEMENT
2	CM	Centimeter
3	EA	each
4	JHR	Years
5	KG	Kilogram
6	KL	Kilolitre
7	KM	Kilometer
8	L	Liter
9	LOT	LOT
10	LS	LUMP SUM
11	M	Meter
12	M2	Square meter
13	M3	Cubic meter
14	MND	MAN DAYS
15	MNW	MAN WEEKS
16	MT	Metric Ton
17	PAA	Pair
18	QTL	QUINTAL
19	RM	RUN. MTR.
20	SET	SET
21	STD	Hours
22	TAG	Days
23	DAY	Days
24	YR	Years

Material Unit Description		
S.No	Legend	Description
1	EA	each
2	FT	Foot
3	FT2	Square foot
4	G	Gram
5	H	Hour
6	KG	Kilogram
7	KL	Kilolitre
8	KM	Kilometer
9	L	Liter
10	LOT	LOT
11	LS	LUMP SUM
12	M	Meter
13	M2	Square meter
14	ML	Milliliter
15	MON	Months
16	MT	Metric Ton
17	PAA	Pair
18	RM	RUN. MTR.
19	ROL	Role
20	SET	SET
21	PAK	Pack
22	CS	Case
23	TAG	Days