OIL INDIA LIMITED **(A Govt. of India Enterprise)** **P.O. DULIAJAN, DIST** **DIBRUGARH** **ASSAM, INDIA, PIN-786602**	**CONTRACTS DEPARTMENT** **TEL: 0374-2800548** **E-mail: *contracts@oilindia.in*** **Website: www.oil-india.com** **FAX: 0374-2803549**

FORWARDING LETTER

Sub: IFB No. CDI2513P27 – Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis.

Dear Sir(s),

1.0 OIL INDIA LIMITED (OIL), a "Maharatna" Category, Government of India Enterprise, is a premier Oil Company engaged in exploration, production and transportation of crude oil & natural gas with its Headquarters at Duliajan, Assam. Duliajan is well connected by Air with nearest Airport being at Dibrugarh, 45 km away.

2.0 In connection with its operations, OIL invites Local Competitive Bids (LCB) from competent and experienced / approved Contractors / Firms for the mentioned work / service under **OPEN INDIGENOUS TENDER, SINGLE-STAGE TWO BID SYSTEM** through OIL's E-Procurement Portal: "https://etender.srm.oilindia.in/irj/portal" for **'Hiring of services for carrying out renovation & interior decoration works in the Rig Electrical Building of Electrical Engineering Department, Duliajan, Assam.'** One complete set of Bid Document covering OIL's IFB for hiring of above services is uploaded in OIL's E-Procurement Portal. You are invited to submit your most competitive bid on or before the scheduled bid closing date and time through OIL's E-Procurement Portal. For your ready reference, few salient points of the IFB (covered in detail in the Bid Document) are highlighted below:

(i)	IFB No./E-Tender No.	:	**CDI2513P27**
(ii)	Type of Bid	:	**Open Indigenous Tender, Single-Stage Two Bid System**
(iii)	Bid Closing Date & Time	:	As mentioned in the E-procurement portal.
(iv)	Technical Bid Opening Date & Time	:	As mentioned in the E-procurement portal.
(v)	Price Bid Opening Date & Time	:	Will be intimated to the eligible/qualified bidders nearer the time.
(vi)	Bid Submission Mode	:	Bids must be uploaded online in OIL's E-Procurement Portal.
(vii)	Bid Opening Place	:	Office of CGM-Contracts (HoD) Contracts Department,

			Oil India Limited, Duliajan-786602, Assam, India.
(viii)	Bid Validity	:	Minimum **120 (One Hundred Twenty) days** from Bid Closing Date. **Note:** In exceptional circumstances, OIL may solicit the Bidder's consent to an extension of the period of validity. The request and the response thereto shall be made in writing (or by Fax). A Bidder may refuse the request. A Bidder granting the request will neither be required nor permitted to modify their bid.
(ix)	Mobilization Period	:	The bidder shall complete the mobilization within 15(fifteen) days from the date of mobilization notice from OIL after issuance of LOA. Mobilization activity will be considered complete upon completion of the following activities: Appointment of Project Manager and reporting of Project Manager to site for initial discussion with OIL team and basic data collection for a duration minimum of 1 day.
(x)	Bid Security/EMD Amount	:	**Rs. 47,64,000.00** (Rupees Forty-Seven Lakh Sixty-Four Thousand) only. **Refer Clause No. 9.0 of Instruction to Bidder (ITB)**
(xi)	Bid Security/EMD Validity	:	**Upto 15.02.2027**
(xii)	Original Bid Security to be submitted	:	Office of CGM-Contracts (HoD) Contracts Department, Oil India Limited, Duliajan-786602, Assam, India.
(xiii)	Amount of Performance Security	:	**10%** of contract value (excl. GST).
(xiv)	Defect Liability Period	:	**12 (Twelve)** months from the date of successful completion, acceptance, and formal handing over of the project to OIL.
(xv)	Validity of Performance Security	:	**15 (fifteen) months** beyond the contract expiry period.
(xvi)	Location of job		Rig Electrical Building of Electrical Engineering Department, FHQ, Oil India Limited, Duliajan, Dibrugarh, Assam.

(xvii)	Period of Contract	:	**12 (Twelve) months** from the date of commencement of the contract i.e., after completion of Mobilization.
(xviii)	Quantum of Liquidated Damage for Default in Timely Mobilization/ Completion	:	**Refer to Clause No. 7** of Special Condition of Contract (SCC).
(xix)	Bids to be addressed to	:	CGM-Contracts (HoD), Contracts Department, Oil India Limited, Duliajan-786602, Assam, India.
(xx)	Pre-Bid conference	:	**Applicable for this tender.** **Tentatively scheduled on 21.08.2026**
(xxi)	Whether tendered quantities are splitable	:	**No**
(xxii)	Deadline for Bid Query	:	**Within 19.08.2026.** Bidders must submit any clarification/ Queries relevant to the tender, if any, within this stipulated time. Company will not be liable to respond to any such clarifications/queries received after the stipulated deadline.
(xxiii)	Extension of Bid Closing Date	:	The Company expects the bidders to adhere to the Bid submission end date timeline. Bidders are requested to refrain from seeking extension of "Bid Closing date" and such request for Bid Closing Date extension shall not be entertained by the Company. However, OIL at its discretion may extend the Bid Closing Date due to unforeseen circumstances.

3.0 GUIDELINES FOR PARTICIPATING IN OIL'S E-PROCUREMENT

3.1 Bids are to be submitted online through OIL's E-Procurement Portal with digital signature. To participate in OIL's E-Procurement tender, bidders should have a legally valid digital certificate **of Class 3 with Organizations Name** and **Encryption Certificate** as per Indian IT Act from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India (http://www.cca.gov.in). Digital Signature Certificates having "**Organization Name**" field other than **Bidder's Name** are not acceptable. However, aforesaid Digital Signature Certificates having Bidder's Name in the "Organization Name" field are acceptable.

Encryption certificate is mandatorily required for submission of bid. In case bidder creates response with one certificate (using encryption key) and then the bidder changes his Digital Signature Certificate, then the old certificate (used for encryption) is required in order to decrypt his encrypted response for getting the edit mode of the response. Once decryption is done, bidder may use new DSC certificate for uploading

and submission of their offer. It is the sole responsibility of the bidder to keep their DSC certificate properly. In case of loss of the certificate, OIL INDIA LTD. is not responsible.

The authenticity of above digital signature shall be verified through authorized CA after bid opening and in case the digital signature used for signing is not of "**Class 3 with Organizations Name** and **Encryption Certificate**", the bid will be rejected.

Only in case of sole proprietorship firms, Digital Signature Certificates issued in the name of the proprietor is also acceptable provided the bid is submitted in the capacity of a proprietorship firm.

Bidder is responsible for ensuring the validity of digital signature and its proper usage by their employee.

The bid including all uploaded documents shall be digitally signed by duly authorized representative of the bidding company.

The bid including all uploaded documents shall be digitally signed by duly authorized representative of the Bidder / Bidding Company to bind the Bidder / Bidding Company to the contract.

3.2 For participation, applicants already having User ID & Password for OIL's E-Procurement Portal need to register against the IFB. New vendors / existing vendors not having User ID & Password for OIL's E-Procurement Portal shall obtain User ID & password through online vendor registration system in E-Portal.

3.2.1 Bidders without having E-Tender Login ID and password should complete their online registration at least 07 (Seven) days prior to the scheduled Bid Closing Date and time of the tender. For online registration, bidder may visit OIL's E-Tender site https://etender.srm.oilindia.in/irj/portal.

3.2.2 Necessary Login ID & Password will be issued by OIL only after submitting the complete online registration by the Bidder. In the event of late registration / incomplete registration by Bidder, OIL INDIA LIMITED shall not be responsible for late allotment of User ID & Password and request for bid closing date extension on that plea shall not be entertained by Company.

3.3 Parties, who do not have a User ID, can click on **Guest** login button in the E-portal to view and download the tender. **The detailed guidelines are available in OIL's E-Procurement site (Help Documentation)**. For any clarification in this regard, bidders may contact E-Tender Support Cell at Duliajan at erp_mm@oilindia.in, Ph.: 0374 - 2807178/4903.

3.4 Details of process for submission of Bid Security (EMD) through the online payment gateway are available in Vendor User Manual under E-Procurement Portal. (**Note:** Important Points for on-line Payment can be viewed at Oil India's website at **URL**: http://oil-india.com/pdf/ETenderNotification.pdf).

3.5 The link to OIL's E-Procurement Portal has been provided through OIL's web site (www.oil-india.com).

4.0 Bid should be submitted online in OIL's E-Procurement site up to **11.00 AM (IST) (Server Time)** on the date as mentioned and will be opened on the same day at **2.00 PM (IST) (Server Time)** at the office of the CGM-Contracts in presence of the authorized representatives of the bidders.

5.0 The rates shall be quoted per unit as specified in the **"PRICE BIDDING FORMAT"** attached under **"Notes and Attachments"** tab. Bidder should note that no

pricing information is furnished in the "**Technical Attachment**" (Un-priced Techno-Commercial Bid) otherwise the bid will be rejected.

6.0 (a) No Bidder can withdraw his bid within the validity or extended validity of the bid. In the event of withdrawal of any bid within validity period, Oil India Limited will suspend the bidder for a period of two years without conducting any enquiry.

(b) Once a withdrawal letter is received from any bidder, the offer will be treated as withdrawn and no further claim / correspondence will be entertained in this regard.

7.0 Conditional bids are liable to be rejected at the discretion of the Company.

8.0 The bidders are required to furnish the composition and status of ownership of the firm in whose name bid documents have been purchased / issued along with one or more of the following documentary evidences (which are applicable to the bidder) in support of the same and scanned copies of the same should be uploaded along with the Un-priced Techno-Commercial Bid documents.

8.1 In case of Sole Proprietorship Firm, Copies of Telephone / Electricity / Mobile Bill, PAN card, latest Income Tax Return form indicating therein the name, business and residential address, E-mail and telephone numbers of the owner and GSTIN number.

8.2 In case of HUF, Copies of Telephone / Electricity / Mobile Bill, PAN card, latest Income Tax Return form, Family Arrangement indicating therein the name, residential address, E-mail and telephone numbers of the owners in general and Karta in particular and GSTIN number.

8.3 In case of Partnership Firm, Copies of Telephone / Electricity / Mobile Bill, PAN card, latest Income Tax Return form indicating therein the name, residential address, E-mail and telephone numbers of all the partners (including the Managing Partner), registered partnership agreement / deed and GSTIN number.

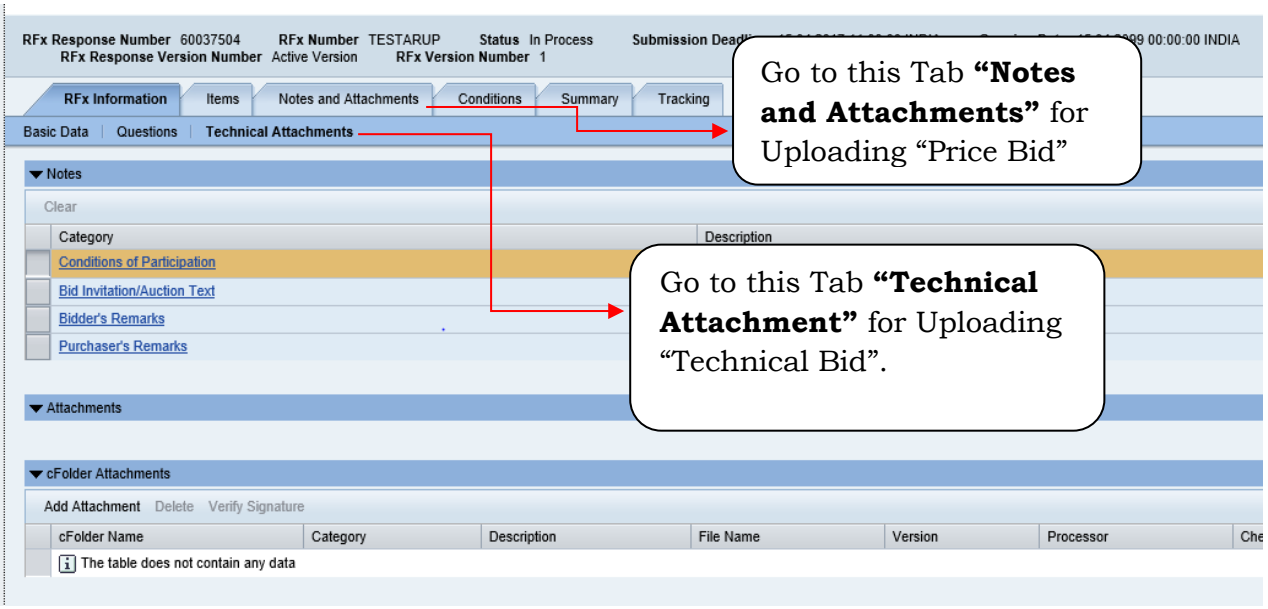
8.4 In case of Co-Operative Societies, Copies of Telephone / Electricity / Mobile Bill, PAN card, latest Income Tax Return form indicating therein the name, residential address, E-mail and telephone numbers of all the Directors or persons who are at the helm of affairs, registration certificate from Registrar of Co-Operative Societies and GSTIN number.

8.5 In case of Societies registered under the Societies Registration Act, Copies of Telephone / Electricity / Mobile Bill, PAN card, latest Income Tax Return form indicating therein the name, residential address, E-mail and telephone numbers of all the Directors or persons who are at the helm of affairs, registration certificate from the Registrar of the state and GSTIN number.

8.6 In case of Joint Stock Companies registered under the Indian Companies Act, Copies of Telephone / Electricity / Mobile Bill, PAN card, latest Income Tax Return form indicating therein the name, residential address, E-mail and telephone numbers of all the Directors or persons who are at the helm of affairs, Certificate of Incorporation from the Registrar of Companies, Memorandum and Articles and GSTIN number.

8.7 In case of Trusts registered under the Indian Trust Act, Copies of Telephone / Electricity / Mobile Bill, PAN card, latest Income Tax Return form indicating therein the name, residential address, E-mail and telephone numbers of all the Trustee or persons who are at the helm of affairs, registration certificate from the Registrar of the state, Trust Deed and GSTIN number.

9.0 SCREEN SHOTS



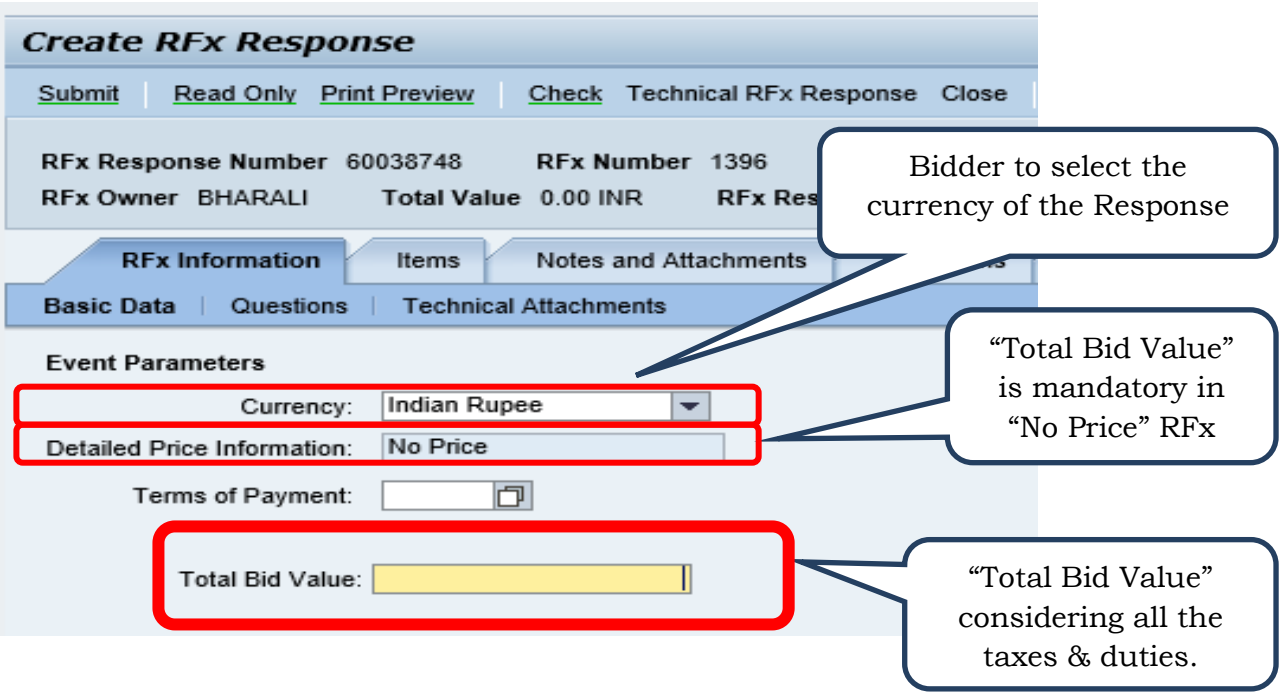
On "**EDIT**" Mode, bidders are advised to upload "**Technical Bid**" and "**Priced Bid**" in the respective places as indicated above:

Note:

***** The "**Technical Bid**" shall contain all techno-commercial details **except the prices**.

****** The "**Priced bid**" must contain the price schedule and the bidder's commercial terms and conditions, if any. For uploading Priced Bid, first click on Add Attachment, a browser window will open, select the file from the PC and name the file under Description, Assigned to General Data and click on OK to digitally sign and upload the File. Please click on Save Button of the Response to Save the uploaded files.

10.0 Maintenance of Total bid value in the Response: For convenience of the Bidders and to improve transparency, the rates/costs quoted by bidders against the E-tender shall be available for online viewing after price bid opening to those bidders whose price bids have been opened in the system. For tenders where **Detailed Price Information under RFx Information Tab is "No price"**, the Price Bid is invited through attachment form under "Notes & Attachment". As per the existing process, Bidders must upload their pricing as per the "Price Bidding Format" under **"Notes & Attachment"**. Additionally the bidders must fill up the **on-line field "Total Bid Value"** under Tab Page **"RFx Information"** with the Total Cost (Including the GST component) as per the amount of the Price Bid in attachment form.



The "Total Bid Value" as entered by the Bidder in the on-line response shall be displayed in the e-tender portal amongst the Techno-Commercially qualified bidders and Company will not take any responsibility whatsoever towards incorrect information furnished by the bidders in the "Total Bid Value" field.

It is to be noted that Amount mentioned in the "Total Bid Value" field will not be considered for bid evaluation and evaluation will be purely based on the "Price bidding Format".

11.0 The selected bidder will be required to enter into a formal contract, which will be based on their bid and OIL's Standard Form of Contract.

12.0 The successful bidder shall furnish a Performance Security Deposit for the amount as mentioned under **Clause 2.0 (xiii)** above and as indicated under **Para 24.0 of ITB / 10.0 of GCC** before signing the formal contract. The Performance Security Deposit will be refunded to the Contractor after satisfactory completion of the work, but a part or whole of which shall be used by the Company in realization of liquidated damages or claims, if any or for adjustment of compensation or loss due to the Company for any reason. This Security Money shall not earn any interest.

13.0 IMPORTANT NOTES: Bidders shall take note of the following important points while participating in OIL's e-procurement tender

13.1 BACKING OUT BY BIDDER: In case any bidder withdraws their bid within the bid validity period, as declared in the "Bid Security Declaration Form", bidder shall be suspended for the period of two years. This suspension of two year shall be automatic without conducting any enquiry.

13.2 BACKING OUT BY L1 BIDDER AFTER ISSUE OF LOA: In case LOA issued is not accepted by the L1 bidder or the Performance Security is not submitted as per the terms of the contract within the time specified in the Bid Document, the Bid Security shall be forfeited and the bidder shall be dealt as per the Banning Policy (available on OIL's website) of Company.

13.3 FURNISHING FRAUDULENT INFORMATION/DOCUMENT: The information and documents furnish by the bidder/contractor in respect of the subject tender/contract

are accepted to be true and genuine. However, if it is detected during technical scrutiny or after award of the contract or after expiry of the contract, that the bidder had submitted any fake/ fraudulent document or furnished false statement, the offer/contract shall be rejected/ cancelled, as the case may be and the bidder (if fake document/false statement pertains to such bidder) shall be dealt as per the Banning Policy (available in OIL's website) of Company. The bidder has to submit an undertaking in this regard as per attached **PROFORMA-XI.**

13.4 PROVISION FOR ACTION IN CASE OF ERRING/DEFAULTING AGENCIES: Erring and defaulting agencies like bidder, contractor, supplier, vendor, service provider will be dealt as per OIL's Banning Policy available in OIL's website: www.oil-india.com.

13.5 The tender is invited under **SINGLE STAGE-TWO BID SYSTEM**. The bidders shall submit both the "**TECHNICAL**" and "**PRICED**" bids through electronic form in the OIL's e-Procurement portal within the Bid Closing Date and Time stipulated in the e-Tender. The Technical Bid should be submitted as per Scope of Work & Technical Specifications along with all technical documents related to the tender and uploaded in **"Technical Attachments" Tab only**. **Bidders to note that no price details should be uploaded in "Technical Attachments" Tab Page. Details of prices as per Price Bid format/Priced bid can be uploaded under "Notes & Attachments" tab. A screen shot in this regard is shown below. Offer not complying with above submission procedure will be rejected as per Bid Evaluation Criteria**

14.0 Time will be regarded as the essence of the Contract and the failure on the part of the Contractor to complete the work within the stipulated time shall entitle the Company to recover liquidated damages and / or penalty from the Contractor as per terms of the tender / contract.

15.0 The contractor will be required to allow OIL officials to inspect the work site and documents in respect of the workers' payment.

16.0 RESTRICTIONS ON PROCUREMENT FROM A BIDDER OF A COUNTRY WHICH SHARES LAND BORDER WITH INDIA:

Subject to **Order No. F. No. 7/10/2021-PPD (1) dated 23.02.2023** (as amended from time to time), issued by Ministry of Finance, Department of Expenditure, Public Procurement Division, Govt. of India, Bidders should take note of the following:

16.1 Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority [Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT)].

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

16.3 "Bidder from a country which shares a land border with India" for the purpose of this Order means:

a. An entity incorporated, established or registered in such a country; or

b. A subsidiary of an entity incorporated, established or registered in such a country; or

c. An entity substantially controlled through entities incorporated, established or registered in such a country; or

d. An entity whose beneficial owner is situated in such a country; or

e. An Indian (or other) agent of such an entity; or

f. A natural person who is a citizen of such a country; or

g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

16.4 The beneficial owner for the purpose of para 18.3 above will be as under:

16.4.1 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 a controlling ownership interest or who exercises control through other means.

Explanation:

a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company;

b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;

16.4.2 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;

16.4.3 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;

16.4.4 Where no natural person is identified under (18.4.1) or (18.4.2) or (18.4.3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;

16.4.5 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.

16.5 An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

16.6 The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority. A declaration as per **Exhibit-I** in this respect to be submitted by the bidder.

16.7 **Validity of registration**: In respect of tenders, registration should be valid at the time of submission of bids and at the time of acceptance of bids. In respect of supply

otherwise than by tender, registration should be valid at the time of placement of order. If the bidder was validly registered at the time of acceptance/placement of order, registration shall not be a relevant consideration during contract execution.

16.8 The bidders to provide an undertaking as per **Exhibit-II & Exhibit-III** along with their bid complying with Clause No. 18.1 above for participation in this tender.

16.9 If the undertakings viz. **Exhibit-I**, **Exhibit-II** and **Exhibit-III** given by a bidder whose bid is accepted is found to be false, this would be a ground for debarment/action as per OIL's Banning Policy and further legal action in accordance with law.

17.0 PRE-BID CONFERENCE:

17.7 **A PRE-BID CONFERENCE is tentatively scheduled to be held on 21.08.2026 at Duliajan** to explain the requirements of Company in details to the interested prospective bidders and to understand bidder's perspective including exchange of views/clarifications, if any, on the SOW, BEC and other terms & conditions of the Tender. The parties who want to participate in the pre-bid conference must confirm their participation and forward the e-mail IDs and contact details of maximum 02 representatives along with their pre-bid queries to email ID: **jintu.borah@oilindia.in** or contracts@oilindia.in , if any latest by **19.08.2026**. Although the tentative date, time, and venue of the Pre-Bid Conference are indicated herein, the exact schedule and venue, shall be intimated to the prospective bidders closer to the date of the conference. Further, the Pre-Bid Conference may also be conducted through Video Conferencing (VC), if considered appropriate.

17.2 It is recommended to the prospective Bidders to attend the pre-bid conference and to make site visits to familiarize themselves with all the salient features of terrain and available infrastructure in OIL's operational areas. This will help the bidder to understand the total requirement for proper bidding.

17.3 **Maximum 02** representatives from each prospective bidder, who registered themselves against the tender shall be allowed to participate in the pre-bid conference. All costs associated to attend the pre-bid conference by their representatives shall be borne by the interested bidders.

17.4 The prospective bidders shall submit their queries/clarifications against the tender through E-mail/Courier addressed to CGM-Contracts, Oil India Ltd., Duliajan-786602, Assam and such queries must reach OIL's office at Duliajan latest by **19.08.2026**. OIL shall provide clarifications to only those queries received within this date. Queries/Clarifications against the tender received beyond **19.08.2026** will not be entertained and replied. OIL will not be responsible for non-receipt or late receipt of any bidder's query in OIL's office.

17.5 Clarifications/exceptions/deviations, if required any, should be brought out by the bidder prior to or during the Pre-Bid Conference only. After processing these suggestions, as a sequel to the pre-bid conference, Company may communicate the changes in this regard, if agreed any, through an addendum to the tender document to the prospective bidders who have registered against the tender. Company will not accept any exception/deviation to tender conditions/specifications once the same are frozen after the pre-bid conference and the non-compliant bid(s) shall be rejected outright against this tender.

17.6 Although the tentative date, time and venue of the Pre-Bid Conference are indicated herein, the exact schedule and venue, shall be intimated to the

prospective bidders closer to the date of the conference. Further, the Pre-Bid Conference may also be conducted through Video Conferencing (VC), if considered appropriate.

18.0 OIL now looks forward to your active participation in the IFB.

Thanking you.

Yours faithfully,
OIL INDIA LIMITED

Sd/-

(JINTU BORAH)
MANAGER-CONTRACTS (SERVICES)
For **DGM-CONTRACTS (SERVICES)**
For **CGM-CONTRACTS (HoD)**
For **RESIDENT CHIEF EXECUTIVE**

INSTRUCTIONS TO BIDDERS

1.0 ELIGIBILITY OF THE BIDDER:

1.1 The eligibility of the bidder are listed under PRE QUALIFICATION CRITERIA (PQC)/ BID EVALUATION CRITERIA (BEC) of the tender document.

1.2 Bidder shall bear all costs associated with the preparation and submission of bid. Oil India Limited, hereinafter referred to as Company, will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

2.0 BID DOCUMENTS:

2.1 The services required, bidding procedures and contract terms are prescribed in the Bid Document. This Bid Document includes the following:

i. A Tender Forwarding Letter.
ii. Instructions to Bidders (ITB)
iii. Bid Evaluation Criteria (BEC) / Pre-Qualifying Criteria (PQC)
iv. General Conditions of Contract (GCC)
v. Special Conditions of Contract (SCC)
vi. Scope of Work (SOW)
vii. Schedule of Work, Unit & Quantity (SOQ)
viii. Price Bidding Format (Attached under "**Notes and Attachments**" tab in the main bidding engine of OIL's E-Tender portal)
ix. Proformas, Annexures, Exhibit & Integrity Pact (IP)
x. Safety Measures (SM)

2.2 The bidder is expected to examine all instructions, forms, terms and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or submission of a bid not substantially responsive to the Bid Documents in every respect will be at the Bidder's risk & responsibility and may result in the rejection of its bid.

2.3 Bidders shall be deemed, prior to submitting their bids, to have satisfied themselves about the weather conditions, working culture in the area, socio-political environment, safety & security aspects, law & order situation and law of the land, and obtain for themselves all necessary information as to the risks, contingencies and all other circumstances, which may influence or affect the various obligations under the Contract.

3.0 TRANSFERABILITY OF BID DOCUMENTS:

3.1 Bid Documents are non-transferable. Bid can be submitted only in the name of the bidder in whose name the Bid Document has been issued.

3.2 In case of e-Tender, Bidder must submit the bid using Organizational Class-3 Digital Signature issued by the Competent Authority in favour of the bidder. Bid submitted using Digital Signature other than the Digital Signature of the bidder shall be summarily rejected.

3.3 Unsolicited bids will not be considered and will be rejected straightway.

4.0 AMENDMENT OF BID DOCUMENTS:

4.1 At any time prior to the deadline for submission of bids, the Company may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bid Documents through issuance of an Addendum(s) / Corrigendum(s) / Amendment(s).

4.2 The Addendum will be uploaded in OIL's E-Tender Portal in the Tab "Technical Rfx" and under External Area - "Amendments" folder. The Company may, at its discretion, extend the deadline for bid submission. Bidders are expected to take the Addendum into account in preparation and submission of their bid. **Bidders are to check from time to time the E-Tender portal ["Technical RFx" Tab and under the folder "Amendments"] for any amendments to the bid documents before submission of their bids. No separate intimation shall be sent to the Bidders.**

5.0 PREPARATION OF BIDS:

5.1 Language of Bids: The bid prepared by the bidder and all correspondence and documents relating to the bid exchanged by the Bidder and the OIL shall be written in English language. Supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate translation of the relevant passages in English, duly authenticated by local chamber of Commerce of bidder's country, in which case, for purposes of interpretation of the bid, the translation shall prevail.

5.2 Bidder's / Agent's Name & Address: Bidders should indicate in their bids their detailed postal address including the Fax / Telephone / Cell Phone Nos. and E-mail address. Similar information should also be provided in respect of their authorized Agents in India, if any.

5.3 Documents comprising the bid: Bids are invited under **Single-Stage Two-Bid System**. The bid to be uploaded by the Bidder in OIL's E-Tender portal shall comprise of the following components:

(A) Technical Bid (to be uploaded in "Technical Attachments" tab):

a) Complete technical details of the services offered.
b) Documentary evidence established in accordance with Clause No. 8.0.
c) Bid Security (scanned) in accordance with Clause No. 9.0 hereunder. Original Bid Security should sent as per Clause No. 9.2 (c) below.
d) Bid Form as per **PROFORMA-I**.
e) Statement of Non-compliance as per **PROFORMA–II**.
f) Integrity Pact, digitally signed by OIL's competent personnel.
g) **PROFORMA-IV** attached with the bid document to be signed by the bidder's authorized representative.
h) All other relevant Undertakings and PROFORMAS as applicable as part of Bid.

Note: **No price should be mentioned in the Technical Bid being uploaded in "Technical Attachments" tab. If any price is mentioned by the bidder in their Technical bid, then their bid will be rejected straightway.**

(B) The Price Bid as per the Price Bid Format shall be uploaded in "Notes and Attachments" tab)

Note: The Price Bid Format containing the prices along with the currency quoted and any other commercial information pertaining to the service offered.

6.0 BID FORM: The bidder shall complete the Bid Form and upload the same along with their Technical bid.

7.0 BID PRICE:

7.1 Prices must be quoted by the Bidders online as per the price bid format available in OIL's E-Tender Portal under "Notes & Attachment" Tab. Prices must be quoted by the bidders as per the Price Bidding format.

7.2 Prices quoted by the successful bidder must remain firm during performance of the Contract and must not be subject to variation on any account, except as otherwise mentioned in the bid document.

7.3 All duties (except customs duty which will be borne by the Company) and taxes (excluding GST) including Corporate Income Tax, Personal Tax, Assam Entry Tax etc. and other Cess / levies payable by the successful bidder under the Contract for which this Bid Document is being issued, shall be included in the rates, prices and total Bid Price submitted by the bidder and the evaluation and comparison of bids shall be made considering the quoted GST in the Price Bid Format. For example, personal taxes and / or any corporate taxes arising out of the profits on the contract as per rules of the country shall be borne by the bidder.

8.0 DOCUMENTS ESTABLISHING BIDDER'S ELIGIBILITY AND QUALIFICATIONS: These are listed in PRE-QUALIFICATION CRITERIA (PQC)/BID EVALUATION CRITERIA (BEC), of the tender documents.

9.0 BID SECURITY

9.1 The Bid Security is required to protect the Company against the risk of Bidder's conduct, which would warrant forfeiture of the Bid Security, pursuant to sub-clause 9.8.

9.2 All the bids must be accompanied by Bid Security in Original as prescribed under, for the amount as mentioned in the "Forwarding Letter" of the tender documents:

a) The Bid Security may be submitted in the form of irrevocable Bank Guarantee (as per **PROFORMA-VIII**) issued by Nationalized or Scheduled Bank in favour of M/s Oil India Limited and payable at DULIAJAN. The Bank Guarantee must be on Non-Judicial Stamp Paper of requisite value as per Indian Stamp Act purchased in the name of Banker. A duly filled undertaking towards details of the BG (as per **PROFORMA-XIII**) must also be submitted along with the scanned copy of BG in the technical bid.

Note: In case the Bidder submits Bid security in the form of Bank Guarantee (BG), the BG must be valid for a **minimum of 45 days (Forty-Five)** days beyond the original bid validity period.

b) Alternately Bid Security can also be paid through Bank Draft / Cashier's Cheque / Banker's Cheque / Fixed Deposit Receipt (Account OIL INDIA LIMITED) / irrevocable Letter of Credit / NEFT / RTGS / Electronic Fund Transfer through Online Payment Gateway of OIL's e-tender portal (subject to credit in OIL's account within prescribed time) to designated account of OIL.

i. If the Bid Security is submitted in the form of Bank Draft, Banker's Cheque, Cashier's Cheque, Fixed Deposit Receipt or Letter of Credit, the same should be in favour of "Oil India Limited" payable at Duliajan.

ii. Bid Security amount through NEFT or RTGS mode may be deposited on or before bid closing date and time to the following designated OIL's bank account:

Bank Details of Beneficiary: OIL INDIA LIMITED		
a	Bank Name	STATE BANK OF INDIA
b	Branch Name	Duliajan
c	Branch Address	Duliajan, Dist.-Dibrugarh
d	Bank Account No.	**10494832599**
e	Type of Account	Current Account
f	IFSC Code	**SBIN0002053**
g	MICR Code	786002302
h	SWIFT Code	SBININBB479

iii. If the bid security is submitted through NEFT or RTGS mode, details such **as UTR No., Tender No., Bidder's name & Deposited Amount etc.** must be uploaded with the Unpriced Techno-Commercial Bid documents.

c) **Submission of bid security in the form of Electronic Bank Guarantee (e-BG):**

Bidders/Contractors are advised to submit the e-BG from any of the following banks presently providing facility to issue an e-BG:

Sl. No.	**Bank Name**	**Sl. No.**	**Bank Name**
1	AU Small Finance Bank	18	Indian Bank
2	Axis Bank	19	Indian Overseas Bank
3	Bank of Baroda	20	IndusInd Bank
4	Bank of India	21	Karnataka Bank
5	Bank of Maharashtra	22	Karur Vysya Bank
6	Canara Bank	23	Kotak Mahindra Bank
7	Central Bank of India	24	Punjab and Sind Bank
8	City Union Bank	25	Punjab National Bank
9	DBS Bank	26	RBL Bank
10	DCB Bank	27	Standard Chartered
11	Dhanlaxmi Bak	28	State Bank of India

12	Federal Bank	29	South Indian Bank
13	HDFC Bank	30	Tamilnad Mercantile Bank Ltd
14	HSBC Bank	31	UCO Bank
15	ICICI Bank	32	Union Bank of India
16	IDBI Bank	33	Yes Bank
17	IDFC First Bank		

BENEFICIARY DETAILS FOR ISSUE OF ELECTRONIC BANK GUARANTEE (e-BG)		
A	Name	OIL INDIA LIMITED
B	PAN	AAAC02352C
C	Date of Incorporation	18-02-1959
D	Email ID	jintu.borah@oilindia.in
E	Mobile No	8876966131
F	Local Address	Duliajan, Dibrugarh, Assam- 786602
G	Registered Address	Duliajan, Dibrugarh, Assam- 786602

d) **Submission of Bid Security/EMD in the form of Insurance Surety Bond:** In case the Bid Security is submitted in the form of Insurance Surety Bond (as per **PROFORMA-IX**), then the following instructions are to be followed:

i) The Insurance Surety Bond shall be from an Insurer as per guidelines issued by Insurance Regulatory and Development Authority of India (IRDAI).

ii) The Company shall be the Creditor, the Bidder shall be the Principal debtor and the Insurance company/Insurer shall be the Surety in respect of the Insurance Surety Bond to be issued by the Insurer.

iii) The Insurance Surety Bond should be on Non-Judicial stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the state(s) where the Insurance Surety Bond is submitted or is to be acted upon or the rate prevailing in State where the Insurance Surety Bond is executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Bidder/Insurer issuing the Insurance Surety Bond.

iv) The expiry date and values should be arrived at in accordance with instructions provided in the “Introduction” of the Tender.

v) The Insurance Surety Bond by bidders will be given from Insurer as specified in the Tender.

vi) A letter from the issuing insurer of the requisite Insurance Surety Bond confirming that the said Insurance Surety Bond / all future communication relating to the Insurance Surety Bond shall be forwarded to the Purchaser at its address as mentioned at "ITB".

vii) Bidder must indicate the full postal address of the Insurer along with the Insurer 's E-mail / Phone from where the Insurance Surety Bond has been issued.

viii) Bidder must indicate Name, Address, Contact number and official Email ID of the Controlling Office of the Surety Issuing Branch or any web portal link, from whom / where the Surety Bond can be got confirmed by the Company.

e) In case of Bidders submitting Bid Security in the form of Bank Guarantee / Bank Draft / Cashier's Cheque / Banker's Cheque / Fixed Deposit Receipt / Letter of Credit/Insurance Surety Bond, the original hard copy of Bid Security should reach the office of CGM-CONTRACTS on or before **12.45 p.m. (IST)** on the bid closing / opening date otherwise bid will be rejected.

f) A scanned copy of Bid Security document should also be uploaded along with the Unpriced Techno-Commercial Bid documents.

g) This Bid Security Deposit shall be refunded to all unsuccessful bidders, but is liable to be forfeited in full or part, at Company's discretion, as per **Clause No. 9.8** below. Bids without Bid Security Deposit in the manner specified above will be summarily rejected.

h) No other mode of payment will be accepted by the Company. The Bid Security shall not earn any interest to the bidder from the Company.

Note:

i. Bidders claiming waiver of Bid Security shall upload supporting documents as mentioned in **Para No. 10.0** below along with technical bid.

ii. Any offer not accompanied with the Bid Security shall be treated as invalid and summarily rejected unless the bidder is exempted from submission of Bid Security as per Bid Security Exemption Criteria of this tender and proper proof towards this exemption is submitted by the bidder. Any subsequent deposit of Bid Security after the bid closing date and time shall not be permitted. Also, adjustment of Bid Security due against the instant tender, against dues from the Company or on any account shall not be permitted.

9.3 Any bid not secured in accordance with sub-clause 9.2 above shall be rejected by the Company as non-responsive.

9.4 The bidders shall extend the validity of the Bid Security suitably, if and when specifically advised by OIL, at the bidder's cost.

9.5 Unsuccessful Bidder's Bid Security will be discharged and / or returned within 30 days after finalization of the Tender.

9.6 Successful Bidder's Bid Security will be discharged and / or returned upon Bidder's furnishing the Performance Security and signing of the contract. Successful bidder will

however ensure validity of the Bid Security till such time the Performance Security in conformity with Clause No. 24.0 below is furnished.

9.7 Bid Security shall not accrue any interest during its period of validity or extended validity.

9.8 The Bid Security may be forfeited:

a. If the bidder withdraws the bid within its original / extended validity.
b. If the bidder modifies / revises their bid suo-moto within its original / extended validity.
c. If the bidder does not accept the contract.
d. If the bidder does not furnish Performance Security Deposit within the stipulated time as per tender / contract.
e. If it is established that the bidder has submitted fraudulent documents or has indulged into corrupt and fraudulent practice, the bid security shall be forfeited after due process in addition to other action against the bidder.

9.9 In case any bidder withdraws their bid during the period of bid validity, Bid Security will be forfeited, and the party shall be debarred as per the prevailing Banning Policy of the Company (OIL).

9.10 A bid shall be rejected straightway if Original Bid Security is not received within the stipulated date & time mentioned in the Tender and / or if the Bid Security validity is shorter than the validity indicated in Tender and / or if the Bid Security amount is lesser than the amount indicated in the Tender.

9.11 The Bank Guarantee issuing bank branch must ensure the following:

The Bank Guarantee issued by the bank must be routed through SFMS platform as per the following details:

(i) MT 760 / MT 760 COV for issuance of bank guarantee.
(ii) MT 760 / MT 767 COV for amendment of bank guarantee.

[Tender Number should reflect in the SFMS text under MT 760 / MT 760 COV]

The above message/intimation shall be sent through SFMS by the BG issuing Bank branch to ICICI Bank Ltd., Duliajan Branch, IFS Code – ICIC0000213; SWIFT Code - ICICINBBXXX. Branch Address: ICICI Bank Ltd, Kunja Bhavan, Daily Bazaar, Duliajan, Dibrugarh, Assam – 786602. The Bank details are as under:

Bank Details of Beneficiary		
A	Bank Name	ICICI Bank Ltd.
B	Branch Name	DULIAJAN
C	Branch Address	Kunja Bhavan, Daily Bazaar, Duliajan, Dibrugarh, Assam – 786602
D	IFSC Code	ICIC0000213
E	Unique identifier code (Field 7037)	OIL503988890
F	Company Name	Oil India Limited
H	SWIFT Code	ICICINBBXXX

10.0 EXEMPTION FROM SUBMISSION OF BID SECURITY : In case any bidder is exempted from paying the bid security, they should upload the supporting documents along with their technical bid. The detailed guidelines for exemption of the Bid security are given below.

a) ~~**MSEs Units (manufacturers/Service Providers** only and not their dealers/distributors) are eligible for exemption of Bid Security~~**. (Not Applicable for this tender) (This being a Works Contract is excluded from the purview of Public Procurement Policy for MSEs Order, 2012):**

b) **Government Departments and Public Sector Undertakings (PSUs)** are exempted from submitting bid security. However, such bidders must submit the bid security declaration as per format enclosed in the tender (**PROFORMA-XV**).

Note: Bids without EMD shall be rejected, if the technical offer does not include a valid copy of relevant Document/Certificate towards exemption of EMD, issued by appropriate authority.

c) ~~Documentation required to be submitted by MSEs:~~.

11.0 PERIOD OF VALIDITY OF BIDS

11.1 Bids shall remain valid as per the requirement mentioned in forwarding letter from the date of closing of bid prescribed by the Company. Bids of shorter validity will be rejected as being non-responsive. If nothing is mentioned by the bidder in their bid about the bid validity, it will be presumed that the bid is valid for **120 days** from Bid Closing Date.

11.2 In exceptional circumstances, the Company may solicit the Bidder's consent to an extension of the period of validity. The request and the response thereto shall be made in writing through Fax or e-mail. A Bidder may refuse the request. A Bidder granting the request will neither be required nor permitted to modify their Bid.

12.0 SIGNING & SUBMISSION OF BIDS:

12.1 Signing of bids:

12.1.1 Bids are to be submitted online through OIL's E-procurement portal with digital signature. The bid and all attached documents should be digitally signed by the bidder using "Class

3" digital certificates with Organization's Name [e-commerce application (Certificate with personal verification and Organisation Name)] as per Indian IT Act 2000 obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India before bid is uploaded. Digital Signature Certificates having Bidder's Name in the "Organization Name" field are only acceptable. Digital Signature Certificate having "Organization Name" field other than Bidder's Name shall be rejected summarily.

The bid including all uploaded documents shall be digitally signed by duly authorized representative of the bidder holding a Power of Attorney to bind the Bidder to the contract.

If any modifications are made to a document after attaching digital signature, the digital signature shall again be attached to such documents before uploading the same.

In case the digital signature is not of "Class-3" with organization name, the bid will be rejected. Bidder is responsible for ensuring the validity of digital signature and its proper usage by their employees.

12.1.2 The original and all copies of the bid shall be typed or written in indelible inks. Since bids are to be submitted ONLINE with digital signature, manual signature is NOT relevant. The Letter of Authority (as per **PROFORMA-IV**) shall be indicated by written Power of Attorney accompanying the Bid.

12.1.3 Any physical documents submitted by bidders shall contain no interlineations, white fluid erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such correction shall be initialed by the person or persons who has / have digitally signed the Bid.

12.1.4 Any Bid, which is incomplete, ambiguous, or not in compliance with the Bidding process shall be rejected.

12.2 Submission of bids:

The tender is processed under **Single Stage Two-Bid System**. Bidder shall submit the Technical bid and Priced bid along with all the Annexures and Proforma (wherever applicable) and copies of documents in electronic form through OIL's e-procurement portal within the Bid Closing Date & Time stipulated in the e-tender. For submission of Bids online at OIL's E-Tender Portal, detailed instructions is available in "User Manual" available in OIL's E-Tender Portal. Guidelines for bid submission are also provided in the "Forwarding Letter". The Technical Bid is to be submitted as per Terms of Reference/Technical Specifications of the bid document and Priced Bid as per the Price Schedule. The Technical Bid should be uploaded in the "Technical Attachment" Tab Page only. Prices to be quoted as per Price Bid Format and should be uploaded as 'Attachment' under "Notes & Attachments" Tab. No price should be given in the "Technical Attachment", otherwise bid shall be rejected. The priced bid submitted in physical form shall not be considered. However, the following documents in one set should necessarily be submitted in physical form in sealed envelope super-scribing the Tender no., Brief Description of services and Bid Closing/Opening date & Time along with the bidder's name and should be submitted to CGM-Contracts, Oil India Ltd., Duliajan-786602 (Assam) on or before 12.45 Hrs (IST) on the bid closing date indicated in the IFB:

a) Printed catalogue and literature if called for in the bid document.
b) Any other document required to be submitted in original as per bid document.

Documents sent through E-mail / Fax / Telephonic method will not be considered.

12.2.1 All the conditions of the contract to be made with the successful bidder are given in various Sections of the Bid Document. Bidders are requested to state their non-compliance to each clause as per **PROFORMA-II** of the bid document and the same should be uploaded along with the Technical Bid.

12.2.2 Timely delivery of the documents in physical form as stated in Para 12.2 above is the responsibility of the bidder. Bidders should send the same through Registered Post or by Courier Services or by hand delivery to the Officer in Charge of the particular tender before the Bid Closing Date and Time. Company shall not be responsible for any postal delay / transit loss.

12.2.3 Bids received through the e-procurement portal shall only be accepted. Bids received in any other form shall not be accepted.

13.0 DEADLINE FOR SUBMISSION OF BIDS:

13.1 Bids should be submitted online as per the online tender submission deadline. Bidders will not be permitted by System to make any changes in their bid/quote after the bid submission deadline is reached. Bidders are requested to take note of this and arrange to submit their bids within the submission deadline to avoid last minute rush/network problems.

13.2 No bid can be submitted after the submission deadline is reached. The system time displayed on the e-procurement web page shall decide the submission deadline.

13.3 The documents in physical form as stated in Para 12.2 must be received by Company at the address specified in the "Forwarding Letter" on or before 12.45 Hrs. (IST) on the Bid Closing Date mentioned in the "Forwarding Letter". Timely delivery of the same at the address mentioned in the Forwarding Letter is the responsibility of the Bidders.

14.0 LATE BIDS: Bidders are advised in their own interest to ensure that their bids are uploaded in system much before the closing date and time of the bid. The documents in physical form if received by the Company after the deadline for submission prescribed by the Company shall be rejected and shall be returned to the Bidders in unopened condition immediately.

15.0 MODIFICATION AND WITHDRAWAL OF BIDS:

15.1 The Bidder after submission of Bid may modify or withdraw its Bid prior to Bid Closing Date & Time in the e-portal using Digital Signature by the person or persons who has / have digitally signed the Bid. Withdrawal or modification of bid through physical correspondence shall not be considered and accepted.

15.2 No Bid can be modified or withdrawn subsequent to the deadline for submission of Bids.

15.3 No Bid can be withdrawn in the interval between the deadline for submission of Bids and the expiry of the period of Bid Validity specified by the Bidder on the Bid Form. Withdrawal of a Bid during this interval by a Bidder shall be debarred from participation in future tenders of OIL.

16.0 EXTENSION OF BID SUBMISSION DATE: Normally no request for extension of Bid Closing Date & Time will be entertained. However, OIL at its discretion, may extend the Bid Closing Date and / or Time due to any reasons.

17.0 BID OPENING AND EVALUATION:

17.1 Company will open the Bids, including submission made pursuant to Clause 12.2, in presence of Bidder's representatives who choose to attend at the date, time and place

mentioned in the Forwarding Letter. However, an authorization letter (as per **PROFORMA-III**) from the Bidder must be produced by the Bidder's representative at the time of Bid Opening. Unless this Letter is presented, the representative will not be allowed to attend the Bid Opening. The Bidder's representatives who are allowed to attend the Bid Opening shall sign a register evidencing their attendance. Only one representative against each Bid will be allowed to attend.

17.2 In technical bid opening, only "Technical Attachment" will be opened. Bidders therefore should ensure that technical bid is uploaded in the "Technical Attachment" Tab Page only in the E-portal.

17.3 In case of any unscheduled holiday or Bandh on the Bid Opening Date, the Bids will be opened on the next full working day. Accordingly, Bid Closing Date / time will get extended up to the next working day and time.

17.4 Bids which have been withdrawn pursuant to **Clause 15.0** shall not be opened. Company will examine bids to determine whether they are complete, whether requisite Bid Security Declarations have been furnished, whether documents have been digitally signed and whether the bids are generally in order.

17.5 At bid opening, Company will announce the Bidder's names, written notifications of bid modifications or withdrawal, if any, the presence of requisite Bid Security Declaration and such other details as the Company may consider appropriate.

17.6 Normally no clarifications shall be sought from the Bidders. However, for assisting in the evaluation of the bids especially on the issues where the Bidder confirms compliance in the evaluation and contradiction exists on the same issues due to lack of required supporting documents in the Bid (i.e. document is deficient or missing), or due to some statement at other place of the Bid (i.e. reconfirmation of confirmation) or vice versa, clarifications may be sought by OIL. In all the above situations, the Bidder will not be allowed to change the basic structure of the Bid already submitted by them and no change in the price or substance of the Bid shall be sought, offered or permitted.

17.7 Prior to the detailed evaluation, Company will determine the substantial responsiveness of each bid to the requirement of the Bid Documents. For purpose of these paragraphs, a substantially responsive bid is one, which conforms to all the terms and conditions of the Bid Document without material deviations or reservation. A material deviation or reservation is one which affects in any substantial way the scope, quality, or performance of work, or which limits in any substantial way, in-consistent way with the Bid Documents, the Company's right or the bidder's obligations under the contract, and the rectification of which deviation or reservation would affect unfairly the competitive position of other bidders presenting substantial responsive bids. The Company's determination of Bid's responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.

17.8 A Bid determined as not substantially responsive will be rejected by the Company and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

17.9 The Company may waive minor informality or nonconformity or irregularity in a Bid, which does not constitute a material deviation, provided such waiver, does not prejudice or affect the relative ranking of any Bidder.

18.0 OPENING OF PRICED BIDS:

18.1 In case of composite bid system, Price bids will be opened on the scheduled bid closing date itself.

18.2 In case of two-bid system, Company will open the Priced Bids of the techno-commercially qualified Bidders on a specific date in presence of representatives of the qualified bidders. The techno-commercially qualified Bidders will be intimated about the Priced Bid Opening Date & Time in advance.

18.3 In case of any unscheduled holiday or Bandh on the Priced Bid Opening Date, the Bids will be opened on the next working day.

18.4 The Company will examine the Price quoted by Bidders to determine whether they are complete, any computational errors have been made, the documents have been properly signed, and the bids are generally in order.

Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price (that is obtained by multiplying the unit price and quantity) the unit price shall prevail and the total price shall be corrected accordingly. If there is a discrepancy between words, and figures, the amount in words will prevail. If any Bidder does not accept the correction of the errors, their Bid will be rejected.

19.0 EVALUATION AND COMPARISON OF BIDS: The Company will evaluate and compare the bids as per BEC/PQC of the Tender Documents.

19.1 Discounts / rebates:

19.1.1 Unconditional discounts / rebates, if any, given in the bid will be considered for evaluation.

19.1.2 Post bid or conditional discounts / rebates offered by any bidder shall not be considered for evaluation of bids. However, if the lowest bidder happens to be the final acceptable bidder for award of contract, and if they have offered any discounts / rebates, the contract shall be awarded after taking into account such discounts/rebates.

20.0 CONTACTING THE COMPANY:

20.1 Except as otherwise provided in **Clause 17.0** above, no Bidder shall contact Company on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded except as required by Company vide sub-clause 17.6.

20.2 An effort by a Bidder to influence the Company in the Company's bid evaluation, bid comparison or Contract award decisions may result in the rejection of their bid.

21.0 AWARD OF CONTRACT:

21.1 **Award criteria:** The Company will award the Contract to the successful Bidder as per the evaluation criteria mentioned under BEC/PQC of the tender document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

22.0 COMPANY'S RIGHT TO ACCEPT OR REJECT ANY BID: Company reserves the right to accept or reject any or all bids 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 of the grounds for Company's action.

23.0 NOTIFICATION OF AWARD:

23.1 Prior to the expiry of the period of bid validity or extended validity, Company will notify the successful Bidder in writing by registered letter or by fax or E-mail (to be confirmed in writing by registered / couriered letter) that its Bid has been accepted.

23.2 The notification of award will constitute the formation of the Contract.

23.3 Upon the successful Bidder's furnishing of Performance Security pursuant to Clause 24.0 below, the Company will promptly notify each un-successful Bidder.

24.0 PERFORMANCE SECURITY:

Successful bidder has to submit Performance Security amount as mentioned in Forwarding Letter, within **30 (Thirty) days** from the date of issue of Letter of Award (LOA).

24.1 a) The Performance Security should be submitted in the form of irrevocable Bank Guarantee (as per **PROFORMA-XII**) issued by Nationalized or Scheduled Bank in favour of M/s Oil India Limited and payable at DULIAJAN. The Bank Guarantee must be on Non-Judicial Stamp Paper of requisite value as per Indian Stamp Act purchased in the name of Banker. A duly filled 'Undertaking' towards details of BG (as per **PROFORMA-XIII**) must also be submitted along with the original BG.

b) Alternately, the Performance Security can also be paid through Bank Draft / Cashier's Cheque / Banker's Cheque / Fixed Deposit Receipt (Account OIL INDIA LIMITED) / irrevocable Letter of Credit / NEFT / RTGS/ Electronic Fund Transfer (subject to credit in OIL's account within prescribed time) to designated account of OIL.

i. If the Performance Security is submitted in the form of Bank Draft, Banker's Cheque, Cashier's Cheque, Fixed Deposit Receipt or Letter of Credit, the same should be in favour of "Oil India Limited" payable at Duliajan.

ii. Performance Security amount through NEFT or RTGS mode may be deposited on or before the date and time specified in Letter of Award (LOA) to the following designated OIL's bank account:

Bank Details of Beneficiary: OIL INDIA LIMITED		
a	Bank Name	STATE BANK OF INDIA
b	Branch Name	Duliajan
c	Branch Address	Duliajan, Dist.-Dibrugarh
d	Bank Account No.	**10494832599**
e	Type of Account	Current Account
f	IFSC Code	**SBIN0002053**
g	MICR Code	786002302
h	SWIFT Code	SBININBB479

iii. If the Performance security is submitted through NEFT or RTGS mode, the bidder shall submit details such as **UTR No., Contract No., Bidder's name & Deposited Amount etc.**

c) **Submission of Performance Security in the form of Electronic Bank Guarantee (e-BG):**

Bidders/Contractors are advised to submit the e-BG from any of the following banks presently providing facility to issue an e-BG:

Sl. No.	Bank Name	Sl. No.	Bank Name
1	AU Small Finance Bank	18	Indian Bank
2	Axis Bank	19	Indian Overseas Bank
3	Bank of Baroda	20	IndusInd Bank
4	Bank of India	21	Karnataka Bank
5	Bank of Maharashtra	22	Karur Vysya Bank
6	Canara Bank	23	Kotak Mahindra Bank
7	Central Bank of India	24	Punjab and Sind Bank
8	City Union Bank	25	Punjab National Bank
9	DBS Bank	26	RBL Bank
10	DCB Bank	27	Standard Chartered
11	Dhanlaxmi Bak	28	State Bank of India
12	Federal Bank	29	South Indian Bank
13	HDFC Bank	30	Tamilnad Mercantile Bank Ltd
14	HSBC Bank	31	UCO Bank
15	ICICI Bank	32	Union Bank of India
16	IDBI Bank	33	Yes Bank
17	IDFC First Bank		

BENEFICIARY DETAILS FOR ISSUE OF ELECTRONIC BANK GUARANTEE (e-BG)		
A	Name	OIL INDIA LIMITED
B	PAN	AAAC02352C
C	Date of Incorporation	18-02-1959
D	Email ID	jintu.borah@oilindia.in
E	Mobile No	8876966131
F	Local Address	Duliajan, Dibrugarh, Assam- 786602
G	Registered Address	Duliajan, Dibrugarh, Assam- 786602

d) **Submission of Performance Security in the form of Insurance Surety Bond:** In case the Performance Security is submitted in the form of Insurance Surety Bond (as per **PROFORMA-XV**), then the following instructions are to be followed:

i) The Insurance Surety Bond shall be from an Insurer as per guidelines issued by Insurance Regulatory and Development Authority of India (IRDAI).

ii) The Company shall be the Creditor, the Contractor shall be the Principal debtor and the Insurance company/Insurer shall be the Surety in respect of the Insurance Surety Bond to be issued by the Insurer.

iii) The Insurance Surety Bond should be on Non-Judicial stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the state(s) where the Insurance Surety Bond is submitted or is to be acted upon or the rate prevailing in State where the Insurance Surety Bond is executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Contractor/ Insurer issuing the Insurance Surety Bond.

iv) The expiry date and values should be arrived at in accordance with instructions provided in the "Introduction" of the Tender.

v) The Insurance Surety Bond by Contractors will be given from Insurer as specified in the Tender.

vi) A letter from the issuing insurer of the requisite Insurance Surety Bond confirming that the said Insurance Surety Bond / all future communication relating to the Insurance Surety Bond shall be forwarded to the Purchaser at its address as mentioned at "ITB".

vii) Contractor must indicate the full postal address of the Insurer along with the Insurer 's E-mail / Phone from where the Insurance Surety Bond has been issued.

viii) Contractor must indicate Name, Address, Contact number and official Email ID of the Controlling Office of the Surety Issuing Branch or any web portal link, from whom / where the Surety Bond can be got confirmed by the Company.

e) In case of Bidders submitting Performance Security in the form of Bank Guarantee/Bank Draft/Cashier's Cheque/Banker's Cheque/Fixed Deposit Receipt/Letter of Credit/Insurance Surety Bond, the original hard copy of Performance Security shall be submitted within the time frame as stipulated in the LOA.

f) No other mode of payment other than the mode covered under Point Nos. a, b, c & d will be accepted by the Company.

24.2 In case performance security is submitted in the form of Fixed/ Term Deposit, the following details must be attached in the form of declaration by the vendor/party for confirmation of Fixed Deposit from the issuing bank.

Full address of the issuing bank
Branch Code

Authorised signatory with full name and designation
Phone (Mobile) Numbers of the branch
Email address of the branch
Such fixed/term deposit must be pledged in favour of OIL and it must in the printed form on the physical original FDR in words "Pledged in favour of Oil India Limited"

24.3 To avoid delay in confirmation of Fixed/ Term deposit from the issuing bank and consequent delay in processing of bills and payment, party shall arrange the confirmation mail regarding issue of fixed/term deposit with the following details from **bank's official email id** to Oil India's following e-mail id (**FD_PS@OILINDIA.IN**)

FD No.	**Issue Date**	**Maturity Date**	**FD Amount**	**Beneficiary/ Contractor Name**	**Whether above FD is pledged in favour of 'Oil India Limited' (Yes/No)**	**FD amount pledged (in ₹) as per bank's books of accounts**	**Mode of FD Renewal (Auto Renewal/Auto closure)**	**Remarks (if any) of the issuing Bank**

24.4 Performance Security shall not accrue any interest during its period of validity or extended validity.

24.5 The Bank Guarantee issuing bank branch must ensure the following:

The Bank Guarantee issued by the bank must be routed through SFMS platform as per the following details:

(i) MT 760/MT 760 COV for issuance of bank guarantee.

(ii) MT 760/MT 767 COV for amendment of bank guarantee.

[Contract Number should reflect in the SFMS text under MT 760/MT 760 COV]

The above message/intimation shall be sent through SFMS by the BG issuing Bank branch to ICICI Bank Ltd., Duliajan Branch, IFS Code – ICIC0000213; SWIFT Code - ICICINBBXXX. Branch Address: ICICI Bank Ltd, Kunja Bhavan, Daily Bazaar, Duliajan, Dibrugarh, Assam – 786602. The Bank details are as under:

Bank Details of Beneficiary		
A	Bank Name	ICICI Bank Ltd.
B	Branch Name	DULIAJAN
C	Branch Address	Kunja Bhavan, Daily Bazaar, Duliajan, Dibrugarh, Assam – 786602
D	IFSC Code	ICIC0000213

E	Unique identifier code (Field 7037)	OIL503988890
F	Company name	Oil India Limited
G	SWIFT Code	ICICINBBXXX

24.6 This Performance Security must be valid for **03 (Three)** months after the date of expiry of the contract period/defect liability period (if any). In the event of contract being extended within the provisions of the contract agreement, the contractor will have to extend suitably the validity of the "Security Deposit" for the extended period.

24.7 The Performance Security Deposit will be refunded to the Contractor after **03 (three) months** of satisfactory completion of works/defect liability period (if any) under the contract (including extension, if any), but a part or whole of which shall be used by the Company in realization of liquidated damages or claims, if any or for adjustment of compensation or loss due to the Company for any reason.

25.0 SIGNING OF CONTRACT:

25.1 At the same time as the Company notifies the successful Bidder that its Bid has been accepted, the Company will either call the successful Bidder for signing of the agreement or send the Contract Form provided in the Bid Documents, along with the General & Special Conditions of Contract, Technical Specifications, Schedule of Rates incorporating all agreements agreed between the two parties.

25.2 The successful Bidder shall sign and date the contract and return it to the Company after receipt of LOA. Till the contract is signed, the LOA issued to the successful bidder shall remain binding amongst the two parties.

25.3 In the event of failure on the part of the successful Bidder to sign the contract, OIL reserves the right to terminate the LOA issued to the successful Bidder and invoke the Performance Security if submitted by the successful Bidder. In case the Bidder fails to sign the contract or submit the Performance Security within the stipulated time as defined in the tender document, Oil India Limited will suspend the Bidder for a period of two years without conducting any enquiry.

26.0 CREDIT FACILITY: Bidders should indicate clearly in the Bid about availability of any credit facility inclusive of Government to Government credits indicating the applicable terms and conditions of such credit.

27.0 MOBILIZATION AND ADVANCE PAYMENT:

27.1 Request for advance payment shall not be normally considered. However, depending on the merit and at the discretion of the Company, advance against mobilization charge may be given at an interest rate of 1% above the prevailing Bank rate (CC rate) of SBI from the date of payment of the advance till recovery / refund.

27.2 Advance payment agreed to by the Company shall be paid only against submission of an acceptable bank guarantee whose value should be equivalent to the amount of advance plus the amount of interest covering the period of advance. Bank guarantee shall be valid for 2 months beyond completion of mobilization and the same may be invoked in the event of Contractor's failure to mobilize as per agreement.

27.3 In the event of any extension to the mobilization period, Contractor shall have to enhance the value of the bank guarantee to cover the interest for the extended period and also to extend the validity of bank guarantee accordingly.

28.0 GOODS AND SERVICES TAX:

28.1 In view of **GST** Implementation from 1st July 2017, all taxes and duties including Excise Duty, CST / VAT, Service tax, Entry Tax and other indirect taxes and duties have been submerged in **GST**. Accordingly, reference of Excise Duty, Service Tax, VAT, Sales Tax, Entry Tax or any other form of indirect tax except of **GST** mentioned in the bidding document shall be ignored.

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

28.2 Bidder should also mention the **Harmonised System of Nomenclature (HSN)** and **Service Accounting Codes (SAC)** at the designated place in the Price Bid Format.

28.3 **Where the OIL is entitled to avail the input tax credit of GST:**

OIL will reimburse the GST to the Supplier of Goods / Services (Service Provider) at actual against submission of Invoices as per format specified in rules/ regulation of GST to enable OIL to claim input tax credit of GST paid. In case of any variation in the executed quantities, the amount on which the GST is applicable shall be modified in same proportion. Returns and details required to be filled under GST laws &rules should be timely filed by supplier with requisite details.

The input tax credit of **GST** quoted shall be considered for evaluation of bids, as per evaluation criteria of tender document.

28.4 **Where the OIL is not entitled to avail/take the full input tax credit of GST:**

OIL will reimburse GST to the Supplier of Goods / Services (Service Provider) at actual against submission of Invoices as per format specified in rules / regulation of GST subject to the ceiling amount of GST as quoted by the bidder. In case of any variation in the executed quantities (If directed and / or certified by the In-Charge) the ceiling amount on which GST is applicable will be modified on pro-rata basis.

The bids will be evaluated based on total price including **GST**.

28.5 It is the responsibility of the bidder to quote the correct GST rate. The classification of goods / services as per GST (Goods & Service Tax) Act should be correctly done by the contractor to ensure that input tax credit on GST (Goods & Service Tax) is not lost to the OIL on account of any error on the part of the contractor.

28.6 Further, it is the responsibility of the bidders to make all possible efforts to make their accounting / IT system GST compliant in order to ensure availability of Input Tax Credit (ITC) to Oil India Ltd.

28.7 GST liability, if any, on account of supply of free samples against any tender shall be to bidder's account.

28.8 In case the bidder is covered under Composition Scheme under GST laws, then bidder should quote the price inclusive of the GST (CGST & SGST / UTGST or IGST). Further, such bidder should mention "Cover under composition system" in column for GST (CGST & SGST/UTGST or IGST) of price schedule.

28.9 OIL will prefer to deal with registered bidder under GST. Therefore, bidders are requested to get themselves registered under GST, if not registered yet. However, in case any unregistered bidder is submitting their bid, their prices will be loaded with applicable GST while evaluation of bid.

28.10 Procurement of Specific Goods: Earlier, there is no tax incidence in case of import of specified goods (i.e. the goods covered under List-34 of Customs Notification no. 12/2012-Cus dated. 17.03.2012 as amended). Customs duty is not payable as per the policy. However, under GST regime, IGST Plus GST compensation cess (if applicable) would be leviable on such imports. Bidders should quote GST as inclusive considering IGST component for the imported Materials portion while quoting their prices on destination basis. However, GST rate to be specified in the price bid format.

28.11 The Supplier of Goods / Services may note the Anti-profiteering Clause (Clause No. 12.5) of Part-I GCC and quote their prices accordingly.

28.12 In case the GST rating of bidder on the GST portal / Govt. official website is negative / black listed, then the bid may be rejected by OIL.

29.0 INTEGRITY PACT:

29.1 OIL shall be entering into an Integrity Pact with the Bidders as per format enclosed vide **"INTEGRITY PACT"** of the Bid Document. The Integrity Pact has been duly signed digitally by OIL's competent signatory and uploaded in the OIL's e-portal. The Integrity Pact shall be returned by the bidder (along with the technical Bid) duly signed by the same signatory who signed the Bid i.e. who is duly authorized to sign the Bid. Uploading the Integrity Pact in the OIL's E-portal with digital signature will be construed that all pages of the Integrity Pact has been signed by the bidder's authorized signatory who has signed the bid. If any bidder refuses to sign Integrity Pact or declines to submit the Integrity Pact, their bid shall be rejected straightway.

29.2 In case of a joint venture, all the partners of the joint venture should sign the Integrity pact;

29.3 In the event of any dispute between the management and the contractor relating to those contracts where Integrity Pact is applicable, in case, both the parties are agreeable, they may try to settle dispute through mediation before the panel of Independent External Monitors (IEMs) in a time bound manner. If required, the organizations may adopt any mediation rules for this purpose. In case, the dispute remains unresolved even after mediation by the panel of IEMs, the organization may take further action as per the terms and conditions of the contract.

29.4 OIL has appointed **Shri Radhakrishna Kini A, IPS (Retd.), Shri Ajit Mohan Sharan, IAS (Retd.), Former Secretary, Ministry of Ayush, Govt. of India** and **Dr. Ved Prakash, ITS (Retd.), Ex-Additional Director General Foreign Trade, Ministry of Commerce** as Independent External Monitors (IEM) for a period of 03 (Three) years to oversee implementation of Integrity Pact in OIL. Bidders may contact the Independent External Monitors for any matter relating to the Integrity Pact at the following addresses:

a. Shri Radhakrishna Kini A, IPS (Retd.)
E-mail ID: arvkini2004@yahoo.co.in & arvkini2004@gmail.com

b. Shri Ajit Mohan Sharan, IAS (Retd.), Former Secretary, Ministry of Ayush, Govt. of India
E-Mail ID: ams057@gmail.com

c. Dr. Ved Prakash, ITS (Retd.), Ex-Additional Director General Foreign Trade, Ministry of Commerce
E-Mail ID: ved60prakash@gmail.com

30.0 LOCAL CONDITIONS:

It is imperative for each Bidder to be fully informed themselves of all Indian as well as local conditions, factors and legislation which may have any effect on the execution of the work covered under the Bidding Document. The bidders shall be deemed, prior to submitting their bids to have satisfied themselves of all the aspects covering the nature of the work as stipulated in the Bidding Document and obtain for themselves all necessary information as to the risks, contingencies and all other circumstances, which may influence or affect the various obligations under the Contract.

No request will be considered for clarifications from the Company (OIL) regarding such conditions, factors and legislation. It is understood and agreed that such conditions, factors and legislation have been properly investigated and considered by the Bidders while submitting the Bids. Failure to do so shall not relieve the Bidders from responsibility to estimate properly the cost of performing the work within the provided timeframe. Company (OIL) will assume no responsibility for any understandings or representations concerning conditions made by any of their officers prior to award of the Contract. Company (OIL) shall not permit any Changes to the time schedule of the Contract or any financial adjustments arising from the Bidder's lack of knowledge and its effect on the cost of execution of the Contract.

31.0 SPECIFICATIONS: Before submission of Bids, Bidders are requested to make themselves fully conversant with all Conditions of the Bid Document and other relevant information related to the works / services to be executed under the contract.

32.0 Bidders are advised to go through uploaded bid documents thoroughly before creation of their bids. Bidders may contact the following in case of any query:

Shri. Jintu Borah, Manager (Contracts)

E-mail: jintu.borah@oilindia.in; contracts@oilindia.in

End of ITB

BID EVALUATION CRITERIA (BEC)/ PRE QUALIFICATION CRITERIA (PQC)

1.0 VITAL CRITERIA FOR BID ACCEPTANCE:

The bid shall conform to the specifications and terms and conditions given in the Bidding Documents. Bids will be rejected in case material and services offered do not conform to the required parameters stipulated in the technical specifications. Notwithstanding the general conformity of the bid to the stipulated specifications, the following requirements will have to be particularly met by the Bidders without which the same will be considered as non-responsive and will not be considered for evaluation. All the documents related to BEC shall be submitted along with the Technical Bid.

Note: Bidders are advised not to take any exception/deviation to the Bid Documents. Exceptions/Deviations, if any, should be brought out during the Pre-Bid Conference as scheduled against this Tender. After processing such suggestions, Company may communicate the changes, if any, through an addendum to the tender document. Still, if any exceptions/deviations are maintained in the bid, such conditional/nonconforming bids shall not be considered, but shall be rejected.

2.0 ELIGIBILITY CRITERIA:

The bidder must be incorporated/constituted in India and must maintain more than or equal to 20% local content (LC) for the offered services to be eligible to bid against this tender.

Regarding calculation of local content and submission of documents during bidding & execution of contracts, provision of **Public Procurement (Preference to Make in India) Order, 2017 of Department for Promotion of Industry and Internal Trade (DPIIT), Govt. of India as revised vide Order No. P45021/2/2017-PP (BE-II) dated 16th September 2020 (and as amended time to time) with modifications as notified vide MoP&NG Order No. FP-20013/2/2017-FP-PNG-Part (4) (E-41432) dated 26th April 2022** (including subsequent amendments thereof, if any), shall be applicable.

If such local content is not maintained during execution of contract, OIL reserves the right to invoke the Performance Securities submitted by the bidding and supporting companies (wherever applicable), in addition to resorting to other options as may be deemed appropriate.

Whether or not the bidders want to avail PP-LC benefit against this tender, it is mandatory for them to meet the following at the bidding stage:

(a) The bidder must provide the specific **percentage (%) of local content** in their bid, without which the bid shall be liable for rejection being non-compliant**.**

(b) The Bidder shall submit an undertaking from the authorised signatory of bidder having the Power of Attorney along with the bid specifying the LC

Percentage and such undertaking shall become a part of the contract, if awarded. [Format enclosed as **PROFORMA-XVII**]

(c) The aforesaid undertaking of the bidder shall also be supported by a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of other than companies) giving the percentage of local content.

(d) Bidder to submit a copy of their Certificate of Incorporation/constitution in India.

3.0 TECHNICAL EVALUATION CRITERIA:

3.1 EXPERIENCE CRITERIA:

3.1.1 The Bidder must be the OEM (Original Equipment manufacturer) of both 33kV (or above) and 11kV (or above) voltage level of Air Insulated Switchgear/Gas Insulated Switchgear. In this regard, the bidder must submit an OEM Declaration/Certificate on its letterhead, duly signed by an authorized signatory, confirming the same.

3.1.2 Bidder must have experience of successfully completing at least one work of Supply, Installation, Testing and Commissioning of 33KV and 11 KV switchgear / switchboard in customized prefabricated modular outdoor container facility (E-House) in previous last 07 (Seven) years reckoned from the original bid closing date in Central/State Government/ PSUs/Nationalized Banks/Public Limited Company.

3.1.3 The bidder shall submit Type Test Certificates issued by National Accreditation board for Testing and calibration Laboratories (NABL)/BIS/CPRI/ILAC accredited laboratories/STL members/central govt. approved laboratories or any other reputed national or international laboratories in the name of the Original Equipment Manufacturer (OEM) only.

For the offered make, model and rating of the 33 kV Switchgear and 11 kV Switchgear, the following Type Test Certificates not older than **15 (fifteen) years** reckoned from the original bid closing date must be submitted along with the bid:

i) Temperature Rise Test
ii) Dielectric Test
iii) Internal Arc Classification Test for Cable Chamber and Busbar Chamber
iv) Short-Time Withstand Current and Peak Withstand Current Tests

3.1.4 Availability of Support for relay: The numerical relays offered for 33 KV and 11 KV switchboard shall be of single make. The relays offered shall be supported by the relay Original Equipment Manufacturer (OEM) for a period of minimum 10 years from the date of Original Bid Closing date of this tender. The bidder shall submit a declaration as per 'Form- Declaration Relay Support' along with the technical bid.

Notes to Clause 3.1.2 above:

A. For proof of requisite experience (refer Clause No. 3.1.2 above), the following documents/photocopy (self-attested/attested) must be submitted along with the bid:

i) Contract document/LOI/LOA/WO showing details scope of work and technical specifications,,

AND

ii) Job Completion Certificate(JCC)issued by the end user/client in their official letter head duly sealed and signed showing:

a) Gross value of job done/ quantity done
b) Nature of jobs done and Work Order No./Contract No.
c) Contract period and date of completion.

OR

SES (Service Entry Sheet)/Certificate of Payment (COP) issued by the company indicating the following:

a) Work Order No./Contract No.
b) Gross value of jobs done/ quantity done.
c) Period of service
d) Nature of service

B. Only Letter of Intent (LOI)/Letter of Award (LOA) and/or Work Order(s), Job Completion certificates are not acceptable as evidence of experience.

C. In case the requisite experience is against **OIL's contract**, the bidder shall only be required to categorically specify **OIL's Contract Number** and **date**.

D. Mere award of contract(s) shall not be counted towards experience. Successful completion of the awarded contract(s), as stipulated respectively under Clause No. 3.1.2 shall only be treated as acceptable experience.

E. Following work experience will also be taken into consideration:

a) If the prospective bidder is executing a contract/order which is still running and a part of contract/order which has been executed within the specified period prior to due date of bid submission is as per Clause 3.1.2 above, such experience may also be taken into consideration provided that the bidder has to submit a satisfactory work / supply and service execution certificate issued by end user confirming requirement as per Clause 3.1.2 above.

b) In case the start date of the requisite experience is beyond the prescribed 07 (seven) years reckoned from the original bid closing date, but completion is within the prescribed 07 (seven) years reckoned from the original bid closing date.

c) If the prospective bidder has executed a contract in which work (as mentioned under Clause No. 3.1.2) is a component of the contract.

Note: In case the documents submitted as per Para A above, are not sufficient to establish the required information of clause 3.1.2 against Para E (a), (b) & (c) above, the bidder shall also have to submit the breakup of the works executed under such contract(s) clearly indicating the value / quantity / period of the work carried out as per clause 3.1.2 which should be certified by the end user or a certificate issued by a practicing Chartered/ Cost Accountant Firm (with Membership Number & Firm Registration Number).

F. Experience of executing work (as mentioned under Clause No. 3.1.2) through 'sub-contracting' shall not be considered for evaluation.

G. Work executed(as mentioned under Clause No. 3.1.2) by a bidder for its own organization/subsidiary cannot be considered as experience for the purpose of meeting BEC.

H. Bid will be rejected if not accompanied with adequate documentary proof in support of Work experience as mentioned in Para 3.1.2.

I. Oil India Limited (OIL) reserves the right to contact the Client(s) referred by the Bidder for authentication of the documents submitted by the Bidder. OIL may contact the clients/operators under intimation/copy to the respective Bidder. It will be the responsibility of the Bidder to take up the matter with his Client(s) and arrange for the confirmation as desired by OIL.]

J. Bidders submitting their bid based on the experience of their Technical Collaborator/Joint Venture/Parent/Subsidiary/Co-subsidiary/Sister Subsidiary/MOU with another party shall not be considered. Bids from Consortium, Joint Venture shall also not be considered.

K. Only one bid from any individual bidder or entity shall be accepted against the tender. If a bidder or firm is found to have participated in more than one bid - either in their own name or through an associated entity, by way of a tie-up/ agreement/Memorandum of Understanding (MoU) - then all such bids shall be summarily rejected.

4.0 MOBILIZATION PERIOD:

The bidders must confirm their compliance in their "technical" bid to complete the mobilization within **15 (Fifteen) days from the date of issuance of Mobilization Notice** Offers without confirmation of stipulated mobilization time or with mobilization time more than **15 (Fifteen) days** shall be summarily rejected. The bidder shall confirm compliance of this in their technical bid.

5.0 FINANCIAL CRITERIA:

5.1 Annual Financial Turnover of the bidder in any of preceding 03 (three) financial/accounting years, reckoned from the original bid closing date should be at least **Rs. 11,90,99,000.00** only.

5.2 **Net worth** of bidder must be positive for preceding financial/accounting year.

Note:

- Annual Financial Turnover of the bidder from operations shall mean: "Aggregate value of the realisation of amount made from the sale, supply or distribution of goods or on account of services rendered, or both, by the company (bidder) during a financial year" as per the Companies Act, 2013 Section 2 (91).

- Net worth shall mean: "Share capital + Reserves created out of profits and securities Premium – Aggregate value of accumulated losses (excluding revaluation reserves) – deferred expenditure – Miscellaneous Expenditure to the extent not written off and carried forward Loss - Reserves created out of write back of depreciation and amalgamation"

- The Net worth to be considered against the clause above, should be read in conjunction with the definition of Net worth as mentioned in Section 2 (57) of The Companies Act, 2013.

Notes to BEC Clause 5.0 above:

A. For proof of Annual Turnover from operation and Net worth any one of the following document must be submitted along with the bid:

(i) A certificate issued by a practicing Chartered/Cost Accountant (with Membership Number and Firm Registration Number), certifying the Annual turnover & Net worth as per format prescribed in **Proforma-VII**.

OR

(ii) Financial Statements (Balance Sheet & Profit & Loss account **along with all the schedules/notes forming part of the Balance sheet & Profit and Loss Account**) audited by the auditors appointed under the statute like Companies Act etc. wherever applicable. In cases where the bidding/ supporting company (as applicable) are not required to prepare Audited Financial Statements as per the Law of the Land of the country of the bidding/supporting company as applicable, the bidder shall provide documentary evidence for the same along with a certificate from a practicing Chartered Accountant or equivalent to this effect. The bidder must also submit the financial statement as per the accounting

standards of the country of the bidding/supporting company as the case may be, duly certified by the practicing-chartered accountant or equivalent.

***Note**: Mention of UDIN (Unique Document Identification Number) is mandatory for all Certificates issued w.e.f. February 1, 2019 by Chartered Accountant in Practice.

B. Considering the time required for preparation of Financial Statements, if the last date of preceding financial/accounting year falls within the preceding six months /within the due date for furnishing of audit report as per Section 139(1) of IT Act, 1961 (read along with latest circulars/notifications issued by CBDT from time to time) reckoned from the original bid closing date and the Financial Statements of the preceding financial/accounting year are not available with the bidder, then the financial turnover of the previous three financial/accounting years excluding the preceding financial/accounting year will be considered. In such cases, the Net worth of the previous financial/accounting year excluding the preceding financial /accounting year will be considered. However, the bidder has to submit an undertaking in support of the same along with their technical bid as per **PROFORMA-VI**.

C. In case the bidder is a Central Govt. organization/PSU/State Govt. organization /Semi-State Govt. Organization or any other Central/State Govt. Undertaking, where the auditor is appointed only after the approval of Comptroller and Auditor General of India and the Central Government, their certificates may be accepted even though FRN is not available. However, bidder to provide documentary evidence for the same.

D. In case the bidder is a Government Department, they are exempted from submission of documents mentioned under **Para-A. & Para-B.** above.

E. Bid will be rejected if not accompanied with adequate documentary proof in support of Annual turnover and Net worth as mentioned in Para 5.1 & 5.2.

6.0 COMMERCIAL EVALUATION CRITERIA

6.1 The bids are to be submitted in **Single stage under Two Bid System** i.e., Un-priced Techno-Commercial Bid and Price Bid together. The Un-priced techno-commercial bid (or technical bid) must comprise of all the technical documents substantiating the previous experience, financial & technical credentials of the bidder and any other document as asked for in the bid document. **There should not be any indication of price in the technical bid; otherwise, the bid shall be rejected straightway**

6.2 The price quoted by the successful bidder must be firm during the performance of the contract and not subject to variation on any account except as mentioned in the bid document. Any bid submitted with an adjustable price quotation other than the above will be treated as non- responsive and rejected.

6.3 **EMD/Bid Security:** Bid Security in Original shall be furnished as a part of the

Techno Commercial Un-priced Bid and shall reach the office of **CGM-CONTRACTS, OIL at Duliajan** on or before **12.45 Hrs (IST)** on the Bid Closing Date (BCD). A scanned copy of the bid security shall however be uploaded in OIL's E-Procurement along with the Technical Bid. The amount of Bid Security shall be **₹ 47,64,000.00.** Bid without proper & valid Bid Security will be rejected. PPP [Public Procurement policy] for Micro and Small Enterprises is not applicable for this tender (**being works contract tender**). Hence, Purchase Preferences allowed as per Government Guidelines in Vogue and exemption from submission of bid security against MSE Units is not applicable for this tender

For detailed may please refer to **Clause No. 9.0 of INSTRUCTIONS TO BIDDERS (ITB).**

6.4 Bid Documents/User Id & Password for OIL's E-Tender portal are not transferable.

6.5 Any bid received in the form of Physical document/Telex/Cable/Fax/E-mail will not be accepted.

6.6 Bids shall be typed or written in indelible ink. The Bids and all uploaded documents must be digitally signed using "Class 3" digital certificate [ecommerce application (Certificate with personal verification and Organization name)] as per Indian IT Act obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India[except copies of the documents required in physical form] should invariably be submitted in the 'Technical Attachment Tab' through OIL's e-bidding portal, before the scheduled date and time for the tender closing. All the documents uploaded shall be digitally signed by the authorized signatory of the bidder.

6.7 Bids shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by bidder, in which case such corrections shall be initiated by the persons(s) signing (digitally) the bid. However, white fluid should not be used for making corrections. Any bid not meeting this requirement shall be rejected.

6.8 Any bid containing false statement will be rejected and action will be taken by Company as per Bid Document.

6.9 Bidders must quote clearly and strictly in accordance with the price schedule outlined in **Price Bidding Format** attached under "**Notes and Attachments**" tab in the main bidding engine of OIL's E-Tender portal; otherwise the bid will be rejected. All other techno-commercial documents other than price details to be submitted with Unpriced Techno-Commercial Bid as per tender requirement under "**Technical Attachment**" Tab Page only.

6.10 Bidder must accept and comply with the following provisions as given in the Tender Document in toto, failing which offer will be rejected:

(i) Firm price

(ii) Bid Security/EMD
(iii) Period of validity of Bid
(iv) Price Schedule
(v) Performance Bank Guarantee / Security deposit
(vi) Delivery/Completion Schedule
(vii) Scope of work
(viii) Guarantee of material/work
(ix) Liquidated Damages clause
(x) Tax liabilities
(xi) Arbitration/Resolution of Dispute Clause
(xii) Force Majeure
(xiii) Applicable Laws
(xiv) Specifications
(xv) Integrity Pact
(xvi) Mobilization

6.11 There should not be any indication of price in the Un-priced Techno-Commercial Bid. A bid will be straightway rejected if this is given in the Un-priced Techno-Commercial Bid.

6.12 Bid received with validity of offer less than **120 (One Hundred Twenty) days** from the date of Technical Bid opening will be rejected. Bidder must submit a declaration regarding bid validity as per the format prescribed in **PROFORMA-I.**

6.13 The Integrity Pact is applicable against this tender. OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide **Proforma-XIX** of the tender document. This Integrity Pact proforma has been duly signed by OIL's competent signatory. The proforma must be returned by the bidder (along with the Un-priced Techno-Commercial Bid) duly signed (digitally) by the same signatory who signed the bid, i.e., who is duly authorized to sign the bid. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact have been signed by the bidder's authorized signatory who sign the Bid.

6.14 Bidders should not be under liquidation/bankruptcy/undergoing any insolvency resolution process as on Bid Closing date. Bidders shall submit undertaking towards compliance of above as per the prescribed formats **(Appendix-1)** along with the bid. If any bidder declines to submit the above undertakings, their bids shall be liable for rejection.

6.15 The bidder shall submit an undertaking/declaration as per **Appendix-2**. confirming that they have read and understood OIL's Banning Policy and that, neither they nor any of their allied concerns or partners or associates or directors, or proprietors involved in any capacity, are currently on OIL's Holiday/Banning List. Further, the bidder shall confirm that neither they nor any of their aforementioned entities have, during the last three years, been involved in any transgression with any company conforming to the Transparency International (TI) approach or with any Public Sector Enterprise of India that could justify exclusion from the tender process. The bidder shall also disclose details of all such allied entities, if any, as required under the Banning Policy.

6.16 Only one bid against a party offering individually as well as under Proprietorship/Partnership firms shall be accepted. In case any bidder is found to submit more than one bid including separate bids under proprietorship as well as under any Partnership firm then all the bids submitted by the bidder in his own name or in the name of firm where he/she is a partner/sole proprietor will be rejected.

7.0 PRICE EVALUATION CRITERIA

7.1 Price bid shall be opened in respect of only the techno-commercially acceptable bidders whose bids have been found to be substantially responsive. A substantially responsive bid is one that meets the terms and conditions of the Tender and/or the acceptance of which bid will not result in indeterminate liability on OIL.

7.2 The quantities shown against each item in the "Price Bid Format" shall be considered for the purpose of Bid Evaluation. It is, however, to be clearly understood that the assumptions made in respect of the quantities for various operations are only for the purpose of evaluation of the bid and the Contractor will be paid on the basis of the actual number of days/parameter, as the case may be.

7.3 If there is any discrepancy between the unit price and the total price, the unit price will prevail and the total price shall be corrected. Similarly, if there is any discrepancy between words and figure, the amounts in words shall prevail and will be adopted for evaluation.

7.4 The bidders are advised not to offer any discount/rebate separately and to offer their prices after considering discount/rebate, if any.

7.5 If a bidder quotes Total Charges/Consideration as NIL, the bid shall be treated as unresponsive and will not be considered.

7.6 Bidders are required to quote for all the items in the BOQ/Price Bid/ Financial Document. However, if no charge is involved for any of the work/item, 'NIL' should be mentioned against such part of work. If any item in the Price Bid Format is left blank, then it will be construed that for that item bidder has quoted rate as "0".

7.7 Conditional and unsolicited discounts will not be considered in the evaluation. However, if such a bidder happens to be the lowest recommended bidder, an unsolicited discount without any condition will be considered for computing the contract price.

7.8 The inter-se-ranking of all the techno-commercially qualified bidders will be determined on overall lowest cost basis (L-1 offer) i.e. considering the Total quoted price inclusive of all liabilities and GST (CGST & SGST/UTGST or IGST).

7.9 Based on the evaluation of techno-commercially qualified bidders, the job will be

awarded to the L-1 bidder.

7.10 In case of identical overall lowest offered rate by more than 01 (one) bidder, the selection will be made by draw of lot between the parties offering the same overall lowest price.

7.11 OIL will prefer to deal with registered bidder under GST. Therefore, bidders are requested to get themselves registered under GST, if not registered yet. However, in case any unregistered bidder is submitting their bid, their prices will be loaded with applicable GST while evaluation of bid. Where OIL is entitled for input credit of GST, the same will be considered for evaluation of bid as per evaluation methodology of tender document.

7.12 When a bidder mentions taxes as extra without specifying the rates & amount, the offer will be loaded with maximum value towards taxes received against the tender for comparison purposes. If the bidder emerges as lowest bidder after such loading, in the event of order on that bidder, taxes mentioned by OIL on the Purchase Order/Contracts will be binding on the bidder.

7.13 Input Tax Credit on GST (Goods & Service Tax) for this service is NOT available to OIL & the bids will be evaluated based on total price including GST.

7.14 For evaluation purposes, quoted unit rates against each Line Item of the price bidding format shall be considered only up to two (2) decimal places without rounding off for evaluation.

8.0 PURCHASE PREFERENCE CLAUSE

8.1 PURCHASE PREFERENCE TO MSE BIDDERS (NOT APPLIACBLE FOR THIS TENDER): Purchase Preference to Micro and Small Enterprises is applicable for this tender. Documentation required to be submitted by MSEs: Categorization and various criteria applicable to MSE bidders shall be guided by the Gazette Notification No. CG-DL-E-26062020-220191 dated 26.06.2020 (and as amended time to time) issued by MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISES. The bidder claiming the MSE status (MSE-General, MSE-SC/ST, MSE-Woman) against this tender has to submit Udyam Registration Number with Udyam Registration Certificate along with the technical bid for availing the benefits applicable to MSEs. Note: In case bidding MSE is owned by Schedule Caste or Schedule Tribe or Woman entrepreneur, valid documentary evidence issued by the agency who has registered the bidder as MSE owned by SC/ST/Woman entrepreneur should also be enclosed.

8.2 PURCHASE PREFERENCE POLICY (LINKED WITH LOCAL CONTENT) (PP-LC): Purchase preference under Public Procurement (Preference to Make in India) Order, 2017 of Department for Promotion of Industry and Internal Trade (DPIIT), Govt. of India as revised vide Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 (and as amended time to time) with modifications as notified vide MoPNG Order No. FP-20013/2/2017-FP-PNG-Part (4) (E-41432) dated 26th April 2022, shall be applicable in this tender. Bidders to check the provisions of

the Order for their eligibility to bid and seek benefits for Purchase preference, accordingly.

8.3 Contract shall be awarded for the entire scope of work under this tender subject to concurrent application of Public Procurement Policy for MSE Order 2012 and PP(MII) Order 2017 as per Order No. F.1/4/2021-PPD dated 18.05.2023 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Govt. of India and any subsequent amendment thereto.

Note: Services under this tender is not splitable.

9.0 GENERAL:

9.1 In case bidder takes exception to any clause of bidding document not covered under BEC/PQC, then the Company has the discretion to load or reject the offer on account of such exception if the bidder does not withdraw / modify the deviation when/as advised by company. The loading so done by the company will be final and binding on the bidders. No deviation will however be accepted in the clauses covered under BEC-BRC.

9.2 To ascertain the substantial responsiveness of the bid, the Company reserves the right to ask the bidder for clarification in respect of clauses covered under BEC also and such clarifications fulfilling the BEC clauses in toto must be received on or before the deadline given by the company, failing which the offer will be liable for rejection. Since pre-bid conference is provisioned in this tender, Company is not obligated to seek any post-bid clarification. However, clarifications if decided to be sought at the option of Company, the same shall be limited to the original submissions only and no independent fresh submission shall be called for/permitted. However, mere submission of such clarification shall not make the offer responsive, unless company is satisfied with the substantial responsiveness of the offer.

9.3 If any of the clauses in the BEC-BRC contradict with other clauses of bidding document elsewhere, the clauses in the BEC-BRC shall prevail.

9.4 Bidder(s) must note that requisite information(s) / financial values etc. as required in the BEC-BRC & Tender must be clearly understandable from the supporting documents submitted by the Bidder(s); otherwise Bids shall be rejected.

9.5 OIL will not be responsible for delay, loss or non-receipt of applications for participating in the bid sent by mail and will not entertain any correspondence in this regard.

9.6 The originals of such documents [furnished by bidder(s)] shall have to be produced by bidder(s) to OIL as and when asked for.

10.0 DOCUMENT AUTHENTICITY UNDERTAKING:

Bidders should note that Company (OIL) may verify authenticity of all the documents /certificates/information submitted by the bidder(s) against the tender. In case at any stage of tendering process or Contract execution etc., if it is established that bidder has submitted forged documents/certificates/information towards fulfilment of any of the tender/contract conditions, Company shall immediately reject the bid of such bidder(s) or cancel/terminate the contract besides taking action as per OIL's Banning Policy dated 6th January 2017 revised on 17.03.2023, available in the OIL's website. Accordingly, service provider/vendor to submit the Undertaking of authenticity of information/documents submitted as per **PROFORMA-XI**.

11.0 LAND BORDER SHARING:

Bidders should submit an Undertaking that, their bid is compliant to Order No. F.No. 6/18/2019-PPD dated 23.07.2020 issued by Ministry of Finance, Department of Expenditure, Public Procurement Division, Govt. of India (including subsequent amendments thereto, if any), regarding restrictions on procurement from a bidder of a country which shares land border with India.

In this regard, bidders must submit duly sealed & signed undertaking as per format provided vide **Exhibit-I, Exhibit-II** and **Exhibit-III** along with the technical bid.

12.0 Bidders have to submit a declaration as per the format prescribed in **PROFORMA-XX** regarding compliance of Safety Measures along with the technical bid.

13.0 CHECKLIST FOR BEC-BRC: Enclosed as BEC/PQC CHECKLIST**(Proforma-XXII) and Commercial Checklist (Proforma-XXI).** To be submitted along with the technical bid.

Note: Bidder shall submit the prescribed checklists for BEC, Technical Criteria etc. If any bidder declines to submit the duly filled checklists, their bids shall not be considered for evaluation.

14.0 COMPLIANCE OF THE COMPETITION ACT, 2002: The bidder shall strictly comply with the provisions of the Competition Act, 2002, more particularly, Section-3 of the Act. Any violation the provisions of the Act shall attract penal action under the Act.

15.0 VERIFICATION AND CERTIFICATION OF DOCUMENTS BY INDEPENDENT THIRD-PARTY INSPECTION AGENCIES (TPIA):

15.1 Oil India Limited (OIL) has engaged the following 17 (Seventeen) Independent Inspection Agencies for a period of 04 (Four) years up to 06.06.2028 to verify the authenticity of documents required against BEC to be submitted by the bidders against the tender:

Sl. No.	**Name of Independent Inspection Agency**	**Contact E-mail ID**
i.	M/s. Alfred H Knight India Private Limited.	a. rkjain@ahkgroup.com b. pradeep.mathur@ahkgroup.com c. info@ahkgroup.com
ii.	M/s. TUV India Private Limited	a. noida@tuv-nord.com b. mumbai@tuv-nord.com c. salim@tuv-nord.com
iii.	M/s Conformity India International Private Limited	a. mktg@ciindia.in
iv.	M/s Ravi Energic Private Limited	a. baroda@ravienergic.com b. tpia@ravienergic.com
v.	M/s SGS India Private Limited	a. dhaval.vora@sgs.com b. sgs.india@sgs.com
vi.	M/s Assure Quality Management Certification Services Private Limited	a. aqmcs@aqmcs.com
vii.	M/s. ISSPL Limited	a. industrial_services@irclass.org b. oilandgas@irclass.org
viii.	M/s. TÜV Rheinland (India) Pvt. Ltd.	a. Shailesh.deotale@ind.tuv.com b. Kaushal.gohil@ind.tuv.com c. info@ind.tuv.com d. ravi.kumar@ind.tuv.com
ix.	M/s Gulf Lloyds (India) Ltd.	a. contact@gulflloyds.com b. inspection@gulflloyds.com
x.	M/s Baltic Testing India Pvt. Ltd.	a. office@balticcontrolindia.com
xi.	M/s Sanmarg Engineering Validation & Assessment	a. Amitra@sanmargeva.com
xii.	M/s Meenar Global Consultants LLP	a. sales@mgellp.in
xiii.	M/s Rites Limited	a. nrinspn@rites.com b. info@rites.com c. sbu.ninsp@rites.com
xiv.	M/s Bureau Veritas (India) Private Limited	a. bvindia.corporate@bureauveritas.com

xv.	M/s TUV SUD South Asia Private Limited	a. Hemant.chavan@tuvsud.com b. Jayashree.rane@tuvsud.com
xvi.	M/s Adornment Engineers India Private Limited	a. jks@adornmentengineers.com
xvii.	M/s TCRC Inspections Pvt. Ltd.	a. admin@tereinspections.com b. ashismallick@teregroup.com c. tenders@teregroup.com

15.2 Bidders are required to have their following documents verified and certified by any one of the empanelled Independent Third-Party Inspection Agencies listed below:

(i) Technical Criteria: Relevant documents required against BEC Clause Nos. 3.0.
(ii) Financial Criteria: Line of Credit, if incorporated in the Tender
(iii) General Requirement: Bidder's Certificate of Incorporation.
(iv) Additional Documents: As per tender requirement.

The Inspection Certificate, duly issued by the selected agency, must be submitted along with the Technical Bid. All costs related to verification and certification by the Thirty-Party Inspection Agencies shall be borne solely by the respective bidders. Payments in this regard shall be made directly by the bidders to the Inspection Agencies. OIL shall not be held responsible for any payment-related dispute between the bidders and the inspection agencies.

15.3 **The verified and certified documents (As mentioned in Para 10.2 above) must be submitted along with the Technical Bid**s. Any bid submitted with un-verified supporting documents shall not be considered. However, in case a bidder submits its bid along with all relevant supporting documents as per BEC without getting all/some of them verified by the designated Independent Inspection agency, such bid can be provisionally considered, provided it is accompanied by an Undertaking by the Bidder on their official letterhead towards submission of the duly verified and certified copies and Inspection Certificate within 07 (Seven) days from the actual date of bid opening. **No reminders or clarifications will be issued by the Company in this regard, and failure to submit the verified/ certified documents within the stipulated time shall result in outright rejection of the bid, at the sole risk and responsibility of the bidder.**

15.4 The methodology of verification/ certification of documents followed by the agencies is broadly as under, but not limited to:

(a) It is the sole responsibility of the bidders intending to participate in the tender to thoroughly understand the requirements of the tender, particularly the documents required under BEC. The bidders must present all relevant documents to any of the empanelled third-party certifying agencies for verification/certification. The TPI Agencies shall verify the authenticity of the documents only. They will not verify whether the documents produced by the bidder are sufficient for meeting the requirements of the tender or not. Neither

OIL nor the Inspection Agencies shall be responsible for the selection or appropriateness of the documents submitted for verification. It is entirely the bidder's responsibility to ensure that the appropriate documents are verified/certified in support of BEC compliance.

(b) The concerned Independent Third-Party Inspection Agencies shall depute their qualified/competent inspector to the Bidder's premises to check the original documents and certify the copies which the bidder shall submit along with their bids.

(c) On issuance of the Inspection Certificate to the bidder, TPI agency should share a copy of the same to concerned Purchase Officer through email directly (Email ID: **jintu.borah@oilindia.in; contracts-services@oilindia.in)**. OIL will reserve the right to ask the inspection agencies to verify the documents with source, if required, at no extra cost to OIL. Verification/Certification of documents by OIL's empanelled third-party inspection agencies shall not automatically make the bidder techno-commercially acceptable or eligible for award of contract.

Notes:

(i) If any documents, LOI/LOA/Orders/Contracts, etc., submitted towards BEC are issued by Oil India Limited, such documents need not be verified by TPI agency.

(ii) Bidder's self-declared undertakings, Audited Balance Sheet & Profit-loss statement and/or CA certificate having UDIN are not required to be verified by the TPI agency.

(iii) Undertaking from TPI Agency as per format (**PROFORMA-M**) enclosed should be submitted along with the Bid.

(iv) In case of clarifications sought by OIL against BEC, supporting documents (historical in nature) to those submitted in the original bid will also have to be verified from the same TPI agency which has originally verified their bid documents. OIL shall categorically mention the documents that are to be submitted with TPI verification in the clarification sought. In case the bidder fails to submit the TPI verified documents, as sought by OIL, as part of their clarification, their offer will be liable for rejection.

***********End of PQC/BEC************

SECTION-I

GENERAL CONDITIONS OF CONTRACT (GCC)

1.0 APPLICABILITY, DEFINITION & INTERPRETATION:

1.1 Applicability

All clauses in the General Conditions of Contract [GCC] shall apply to all transactions except as otherwise stated in the Special Conditions of Contract [SCC] and/or BEC-BRC. Furthermore, in the event if there is any conflict between the Principal text of the Agreement and the Appendixes, the Principal text will prevail.

1.2 Definition & Interpretation

In the contract (as hereinafter defined) the following words and expressions shall have the meaning hereby assigned to them except where the context otherwise requires:

1.2.1 COMPANY/OIL/Operator:

Shall mean Oil India Limited [OIL] a public sector undertaking, incorporated under COMPANY's Act 1956 having its registered office at Duliajan-786602, Assam, India and includes its successor and permitted assigns.

1.2.2 CONTRACTOR:

Shall mean the person or persons, firm or COMPANY or corporation incorporated in India or abroad, who has been awarded with the contract and includes contractor's legal representatives, his successors and permitted assigns.

1.2.3 Contract:

Shall mean a written agreement between the COMPANY and the CONTRACTOR for execution of the services/works including all contract documents and subsequent amendments, if any.

1.2.4 Site:

Shall mean the place in which the operations/services are to be carried out or places approved by OIL for the purposes of the CONTRACT together with any other places designated in the CONTRACT as forming part of the site.

1.2.5 COMPANY's Site Representative/Engineer:

Shall mean the person or the persons appointed by the COMPANY from time to time to act on its behalf at the site for overall co-ordination, supervision and project management at site.

1.2.6 Sub-Contract:

Shall mean order/contract placed by the CONTRACTOR for any portion of the CONTRACT or work sublet with necessary written consent of COMPANY on third party. Such sub-letting shall not relieve the CONTRACTOR from any obligation, duty or responsibility under the CONTRACT.

1.2.7 Sub-Contractor:

Shall mean any person or firm or COMPANY (other than CONTRACTOR) to whom any part of the work has been entrusted by CONTRACTOR, with written consent of OIL or the persons appointed by OIL, successors and permitted assigns of such persons, firm or COMPANY**.**

1.2.8 Contractor's Representative:

Shall mean such person/or persons duly appointed representative at the site and base as the CONTRACTOR may designate in writing to the COMPANY as having authority to act for the CONTRACTOR in matters affecting the work and to provide the requisite services.

1.2.9 Contract Price/Value*:*

Shall mean the sum accepted or the sum calculated in accordance with the rates accepted in tender and/or the contract rates as payable to the CONTRACTOR for the entire execution and completion of the services/works, including amendments/modification/change order issued by the COMPANY.

1.2.10 Firm price:

The prices will remain unchanged, except for statutory changes, during currency of the CONTRACT unless specifically agreed to in writing by COMPANY.

1.2.11 Service/Works/Operations:

Shall mean and include all items and things to be supplied/done and all work/Service to be performed by the CONTRACTOR as specified in the Scope of Work under this CONTRACT and shall also include all extra, additional, altered or substituted works/services as required for the purpose of successful execution of the Contract.

1.2.12 Equipment/Materials/Goods:

Shall mean and include any equipment, machinery, instruments, stores, goods which CONTRACTOR is required to provide to the COMPANY for/under the CONTRACT and amendments thereto.

1.2.13 Drawings:

Shall mean and include all Engineering sketches, general arrangements/layout drawings, sectional plans, all elevations, photographs, etc. related to the CONTRACT together with modification and revision thereto.

1.2.14 Specifications:

Means and includes all technical specifications, provision attached and referred to in the tender/contract document regarding method and manner of performing the services and qualities of the service/materials to be provided under the contract and also as modified by the COMPANY/its site representative during the execution of contract in the best interest of service.

1.2.15 Engineer In-charge (EIC):

Shall mean the person designated from time to time by the COMPANY and shall include those who are expressly authorized by the COMPANY to act for and on its behalf for operation of the contract.

1.2.16 Inspectors:

Shall mean any person or outside Agency nominated by COMPANY to inspect equipment, materials and services, if any, in the CONTRACT (stage wise as well as final) as per the terms of the CONTRACT.

1.2.17 Tests:

Shall mean such process or processes to be carried out by the CONTRACTOR as are prescribed in the CONTRACT, considered necessary by the COMPANY or their representative to ascertain quality, workmanship, performance and efficiency of equipment or services thereof.

1.2.18 Approval:

Shall mean and include the written consent duly signed by COMPANY or their authorized official in respect of all documents, drawings or other particulars in relation to the CONTRACT.

1.2.19 Day:

Shall mean a calendar day of twenty–four (24) consecutive hours beginning at 00:00 hours with reference to local time at the site.

1.2.20 Month:

Shall mean a calendar month as per Gregorian calendar.

1.2.21 Year:

Shall mean calendar year as per Gregorian calendar.

1.2.22 Working day:

Means any day which is not declared to be holiday by the COMPANY.

1.2.23 Bid/offer:

Shall mean the proposal/Offer along with supporting documents submitted by the bidder in response to the tender or enquiry in accordance with the terms of Tender or Enquiry, for consideration by COMPANY, prior to award of contract.

1.2.24 Guarantee:

Shall mean the period and other conditions governing the warranty/guarantee of the services as provided in the CONTRACT.

1.2.25 Mobilization:

Shall mean rendering the equipment fully manned and equipped as per CONTRACT and ready to begin work at site designated by the COMPANY and accepted by the COMPANY after inspection.

1.2.26 De-mobilization:

Shall mean the removal of all items forming part of the Mobilization from the site ofthe COMPANY and inspection and acceptance thereafter by the COMPANY including compliance of requirement in relation to re-export of imported equipment/materials under concessional duty scheme in accordance with relevant notification from Customs Authorities.

1.2.27 Willful Misconduct:

Shall mean intentional disregard of good and prudent standards of performance or proper conduct under the Contract with knowledge that it is likely to result in any injury to any person or persons or loss or damage of property of the Company orThird Party.

1.2.28 Gross Negligence:

Shall mean any act or failure to act (whether sole, joint or concurrent) by a person or entity which was intended to cause, or which was in reckless disregard of or unjustifiable indifference to, avoidable and harmful consequences such person or entity knew, or should have known, would result from such act or failure to act. Notwithstanding the foregoing, Gross negligence shall not include any action taken in good faith for the safeguard of life or property.

1.2.29 Criminal Negligence:

Shall mean that the crime happened negligently, there was duty of care upon the Person but inadvertently due to his negligence, the duty was breached, which causes harm to the people in the form of death or serious injury.

1.2.30 GST Legislations:

'GST legislations' means 'any or all of the following legislations as may be applicable to the CONTRACTOR and OIL:

(A) The Central Goods & Services Tax Act, 2017;
(B) The Integrated Goods & Services Act, 2017;
(C) The Union Territory Goods & Services Tax Act, 2017;
(D) The respective State Goods & Service Tax Acts'
(E) The Goods and Services (Compensation to States) Act, 2017
(F) The Customs Act and the Customs Tariff Act.
(G) Any other applicable Act related to GST

2.0 <u>CONTRACT DOCUMENT</u>:

2.1 Governing language: The governing language for the CONTRACT shall be English. All CONTRACT documents and all correspondence and communication to be given and all other documentation to be prepared and supplied under the CONTRACT shall be written in English and the CONTRACT shall be construed and interpreted in accordance with English language.

2.2 Entire Agreement: The CONTRACT constitutes the entire agreement between OIL and the CONTRACTOR with respect to the subject matter of the CONTRACT and supersedes all communication, negotiations and agreement (whether written or oral) of the parties with respect thereto made prior to the date of this agreement, unless such communication(s) expressly forms part of the contract or included by reference.

2.3 Amendment in CONTRACT: No Amendment of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party thereto. OIL shall not be bound by any printed conditions, provisions in the CONTRACTOR's BID, forms of acknowledgement of CONTRACT, invoice

and other documents which purport to impose any condition at variance with or supplement to CONTRACT.

3.0 WAIVERS AND AMENDMENTS:

3.1 Waivers: It is fully understood and agreed that none of the terms and conditions of this contract shall be deemed waived by either party unless such waiver is executed in writing only by the duly authorized representatives of both the parties. The failure of either party to execute any right shall not act as a waiver of such right by such party.

3.2 Change Program: It is agreed that CONTRACTOR shall carry out work in accordance with the completion program (e.g. Drilling programme) to be furnished by the COMPANY, which may be changed from time to time by reasonable modifications in the program as COMPANY sees fit. COMPANY's instruction in this regard shall be final and binding.

4.0 CONTRACT TIMELINE:

4.1 Effective Date of Contract: The contract shall become effective as of the date COMPANY notifies the CONTRACTOR in writing that it has been awarded the contract. This date of issuance of Letter of Award (LOA) by the COMPANY will be the Effective Date of Contract. All terms and conditions of the contract shall come into force with the date of issuance of LOA.

4.2 Date of Commencement of Operation:

The date on which the mobilization is completed in all respects and CONTRACTOR is ready to commence operation as per the contract provision [Certified by the COMPANY's representative] will be treated as the date of Commencement of Operation.

4.3 Duration of the contract:

The contract shall be valid for a period as defined in the LOA and Special Conditions of Contract [SCC].

5.0 SCOPE OF WORK/CONTRACT:

Scope of the CONTRACT shall be as defined in the CONTRACT, specifications, drawings and Appendices.

6.0 GENERAL OBLIGATION OF CONTRACTOR:

CONTRACTOR shall, in accordance with and subject to the terms and conditions of this Contract:

6.1 Perform the work described in the Terms of Reference/Scope of Work. The CONTRACTOR shall execute the work with professional

competence and in an efficient and workman like manner.

6.2 Except as otherwise provided in the Terms of Reference and the special Conditions of the contract, employ all labours/personnel as required to perform the work.

6.3 Perform all other obligations, work and services which are required by the terms of this contract or which reasonably can be implied from such terms as being necessary for the successful and timely completion of the work.

6.4 Comply with all applicable statutory obligations specified in the contract.

6.5 CONTRACTOR shall be deemed to have satisfied himself before submitting their bid as to the correctness and sufficiency of its bid for the services required and of the rates and prices quoted, which rates and prices shall, except insofar as otherwise provided, cover all its obligations under the contract.

6.6 CONTRACTOR shall be deemed, prior to submitting their bids, to have satisfied themselves about the weather conditions, working culture in the area, socio-political environment, safety & security aspects, law & order situation and law of the land, and obtain for themselves all necessary information as to the risks, contingencies and all other circumstances, which may influence or affect the various obligations under the Contract.

6.7 CONTRACTOR shall give or provide all necessary supervision during the performance of the services and as long thereafter within the warranty period as COMPANY may consider necessary for the proper fulfilling of CONTRACTOR's obligations under the contract.

7.0 GENERAL OBLIGATION OF COMPANY:

COMPANY shall, in accordance with and subject to the terms and conditions of this contract:

7.1 Pay CONTRACTOR in accordance with terms and conditions of the contract.

7.2 Allow CONTRACTOR access, subject to normal security and safety procedures, to all areas as required for orderly performance of the work as specified in the Scope of Works of the contract or work connected therewith.

7.3 Perform all other obligations required of COMPANY by the terms of this contract.

8.0 DUTIES AND POWER/AUTHORITY:

8.1 OIL's site representative/engineer:

The duties and authorities of OIL's site representative/engineer are to act on behalf of OIL for:

i. Overall supervision, co-ordination and Project Management at site

ii. Proper and optimum utilization of equipment and services.

iii. Monitoring of performance and progress

iv. Commenting/ countersigning on reports made by the CONTRACTOR's representative at site in respect of works, receipts, consumption etc. after satisfying himself with the facts of the respective cases.

v. He shall have the authority, but not obligation at all times and any time to inspect/test/examine/verify any equipment machinery, instruments, tools, materials, personnel, procedures and reports etc. directly or indirectly pertaining to the execution of the work. However, this shall not construe to imply an acceptance by the inspector. Hence, the overall responsibility of quality of work shall rest solely with the CONTRACTOR.

vi. Each and every document emerging from site in support of any claim by the CONTRACTOR has to have the countersignature/comments of the OIL's representative/engineer without which no claim shall be entertained by the OIL.

8.2 CONTRACTOR's representative:

(a) The CONTRACTOR's representative shall have all the powers requisite for the performance of the Service/Works, subject to holding due authorization from the CONTRACTOR.

(b) Representative(s) shall liaise with OIL's representative/engineer for the proper co-ordination and timely completion of the works and on any matter pertaining to the works.

(c) Representative(s) shall extend full co-operation to OIL's representative/inspector/engineer in the manner required by them for supervision/inspection/observation of equipment, material, procedures, performance, reports and records pertaining to works.

(d) To have complete charge of CONTRACTOR's personnel engaged in the performance of the work and to ensure compliance of rules and regulations and safety practice.

9.0 Personnel to be deployed by contractor:

CONTRACTOR warrants that it shall provide competent, qualified and sufficiently experienced personnel to perform the work correctly and efficiently.

9.1 The CONTRACTOR should ensure that their personnel observe all statutory safety requirement including those prescribed by the COMPANY. Upon COMPANY's written request, CONTRACTOR, entirely at its own expense, shall remove immediately any personnel of the CONTRACTOR determined by the COMPANY to be unsuitable and shall promptly replace such personnel with personnel acceptable to the COMPANY. Replacement personnel should be mobilized within 15 days from the date of issuance of notice without affecting the operation of the COMPANY.

9.2 The CONTRACTOR shall be solely responsible throughout the period of the contract for providing all requirements of their personnel including but not limited to, their transportation to & fro from Duliajan/field site, enroute/local boarding, lodging, personal protective gear & medical attention etc. COMPANY shall have no responsibility or liability in this regard.

9.3 However, COMPANY shall provide available medical assistance/facilities to CONTRACTOR's Personnel in case of emergency at its own establishment on chargeable basis.

9.4 CONTRACTOR's key personnel shall be fluent in English language (both writing and speaking).

10.0 <u>PERFORMANCE SECURITY</u>:

10.1 On receipt of notification of award from the COMPANY, the CONTRACTOR shall furnish the Performance Security to COMPANY within **Thirty (30)** days from the date of issue of LOA for an amount specified in the Forwarding Letter and Letter of Award (LOA) as per Proforma-Form and must be in the form of an Insurance Surety Bond/Bank Draft/Cashier's cheque/Banker's cheque*/NEFT/RTGS/Electronic fund transfer to designated account of OIL# or Fixed Deposit Receipt (account OIL INDIA LIMITED) or irrevocable Bank Guarantee or irrevocable Letter of Credit (LC) from:

a. Any schedule Indian Bank or Any Branch of an International bank situated in India and registered with Reserve Bank of India as scheduled foreign bank in case of domestic CONTRACTOR/service provider.

OR

b. Any scheduled bank in India or from International bank who has its branch in India registered with Reserve Bank of India, in case of foreign CONTRACTOR/service provider.

OR

c. Any foreign Bank which is not a Scheduled Bank in India, provided the Bank Guarantee issued by such Bank is counter-guaranteed by any Branch situated in India of any Scheduled Bank incorporated in India.

Note: Bank Guarantee issued by a Scheduled Bank of India at the request of some other Non-Schedule Bank of India shall not be acceptable.

10.2 Bank Guarantee issued by a Bank, amongst others, must contain the following particulars of such bank:
Full address Branch Code
Code Nos. of the authorized signatory with full name and designation.
Phone Nos.
Fax Nos.
E-mail address.

10.3 The domestic CONTRACTOR/service provider(s) will have to submit the Bank Guarantee from any of the scheduled banks and on non-judicial stamp paper of requisite value as per the Indian Stamp Act, purchased in the name of the issuing banker.

10.4 The foreign CONTRACTOR/service provider(s) will submit the Bank Guarantee from Banks of Indian origin situated in their country. In case no such bank of Indian origin is situated in their country, the Bank Guarantee may be submitted from the bankers as specified above.

10.5 The Performance Security shall be denominated in the currency of the contract.

10.6 The Performance Security specified above must be valid for the entire duration of the Contract and claim period should be valid for a minimum of 03 (three) months beyond the contract period. The Performance Security will be discharged by COMPANY not later than 30 days following its expiry of claim period. In the event of any extension of the Contract period, Bank Guarantee should be extended by CONTRACTOR by the period equivalent to the extended period.

10.7 The Performance Security shall be encased by COMPANY on account of CONTRACTOR's failure to fulfil its obligations under the Contract and/or non- performance/un-satisfactory performance of the Contractor. Company shall not be required to proof any loss or damage on account of Contractor's non-performance/un-satisfactory performance.

10.8 The Performance Security will not accrue any interest during its period of validity or extended validity.

10.9 Failure of the successful Bidder to comply with the requirements of clause 10.0 shall constitute sufficient grounds for annulment of the award. In such an eventuality, action will be initiated as per the Banning Policy of OIL in vogue.
Subject to credit in OIL's account within prescribed time

* The validity of Bank Draft/Cashier's/Banker's cheque (as applicable) should not beless than 3 months.

In the event CONTRACTOR fails to honour any of the commitments entered into under this agreement, and/or in the event of termination of the contract under provisions of Integrity Pact and/or in respect of any amount due from the CONTRACTOR to OIL, OIL shall have unconditional option under the guarantee to invoke the above bank guarantee and claim the amount from the bank. The bank shall be obliged to pay the amount to OIL on demand.

11.0 SIGNING OF CONTRACT:

11.1 The successful bidder is required to sign a formal detailed contract with OIL within a maximum period of 60 days of date of LOA. Until the contract is signed, the LOA **as well as GCC & SCC as prescribed in the Tender**, shall remain binding amongst the two parties. In the event of failure on the part of the successful Bidder to sign the contract, OIL reserves the right to terminate the LOA issued to the successful Bidder and invoke the Performance Security if submitted by the successful Bidder. Such CONTRACTOR shall be put on holiday as per the Banning Policy of OIL [available at www.oil-india.in].

12.0 CLAIMS, TAXES & DUTIES:

12.1 **Claims:** CONTRACTOR agrees to pay all claims, taxes and fees for equipment, labour, materials, services and supplies to be furnished by it hereunder and agrees to allow no lien or charge resulting from such claims to be fixed upon any property of COMPANY. COMPANY may, at its option, pay and discharge any liens or overdue charges for CONTRACTOR's equipment, labour, materials, services and supplies under this CONTRACT and may thereupon deduct the amount or amounts so paid from any sum due, or thereafter become due, to CONTRACTOR hereunder.

12.2 **Notice of claims:** CONTRACTOR or COMPANY, as the case may be, shall promptly give the other, notice in writing of any claim made or proceeding commenced for which that party is entitled to indemnification under the CONTRACT. Each party shall confer with the other concerning the defense of any such claims or proceeding, shall permit the other to be represented by counsel in defense thereof, and shall not affect settlement of or compromise any such claim or proceeding without the other's written consent.

12.3 Taxes:

12.3.1 CONTRACTOR, unless specified otherwise in the CONTRACT, shall bear all tax liabilities, duties, Govt. levies etc. including GST and customs duty, Corporate and personnel taxes levied or imposed on the CONTRACTOR on account of payments received by it from the COMPNAY for the work done under this CONTRACT. It shall be the responsibility of CONTRACTOR to submit to the concerned Indian authorities, the returns and all other concerned documents required for this purpose and to comply in all respects with the requirements of the laws in this regard, in time.

12.3.2 Tax levied on CONTRACTOR as per the provisions of Indian Income Tax Act and any other enactment/rules on income derived/payments received under the contract will be on CONTRACTOR's account. CONTRACTOR shall be responsible for payment of personal taxes, if any, for all the personnel deployed in India by CONTRACTOR.

12.3.3 The CONTRACTOR shall furnish to the COMPANY, if and when called upon to do so, relevant statement of accounts or any other information pertaining to work done under the contract for submitting the same to the Tax authorities, on specific request from them in accordance with provisions under the law. CONTRACTOR shall be responsible for preparing and filing the return of income etc. within the prescribed time limit to the appropriate authority.

12.3.4 Prior to start of operations under the contract, the CONTRACTOR shall furnish the COMPANY with the necessary documents, as asked for by the COMPANY and/or any other information pertaining to the contract, which may be required to be submitted to the Income Tax authorities at the time of obtaining "No Objection Certificate" for releasing payments to the CONTRACTOR.

12.3.5 Corporate income tax will be deducted at source from the invoice at the specified rate of income tax as per the provisions of Indian Income Tax Act as may be in force from time to time and COMPANY will issue TDS Certificate to the CONTRACTOR as per the provisions of Income Tax Act.

12.3.6 Corporate and personnel taxes on CONTRACTOR shall be the liability of the CONTRACTOR and the COMPANY shall not assume any responsibility on this account.

12.3.7 All local taxes, levies and duties, sales tax, octroi, etc. on purchases and sales made by CONTRACTOR shall be borne by the CONTRACTOR.

12.3.8 CONTRACTOR shall provide all the necessary compliances/ invoice/documents for enabling OIL to avail Input tax credit benefits in respect of the payments of GST which are payable against the

CONTRACT. The CONTRACTOR should provide tax invoice issued under GST legislations for the goods and Services (indicating GST). Payment towards the components of GST shall be released by OIL only against appropriate documents i.e.: Tax Invoice/Bill of entry for availing input tax credit (as applicable).

12.3.9 The tax invoices as per above provisions should contain all the particulars as required under the invoicing rules under the GST legislations, including, but not limited to the following:

i. Name, Address and the GST Registration Number (under the relevant Tax Rules) of the Service Provider (CONTRACTOR)
ii. Name and Address and GST Registration Number of the Service Receiver (Address of OIL)
iii. Description, Classification and Value of taxable service/goods and the amount of applicable tax (CGST, SGST, IGST, UTGST and cess)

12.3.10 In case of imported goods, CONTRACTOR/supplier is required to provide original Bill of Entry or copy of Bill of Entry duly attested by Custom authority.

12.3.11 The CONTRACTOR should mention the Place of supply in the invoice raised under GST Law.

12.3.12 OIL would not accept any invoice without its GSTIN mentioned on the invoice

Note: CONTRACTOR who is under composition levy of the GST legislation would raise Bill of supply instead of Tax invoice, which will have GSTIN of supplier as well as OIL.

12.4 Goods and Services Tax:

12.4.1 "GST" shall mean Goods and Services Tax charged on the supply of material(s) and services. The term "GST" shall be construed to include the Integrated Goods and Services Tax (hereinafter referred to as "IGST") or Central Goods and Services Tax (hereinafter referred to as "CGST") or State Goods and Services Tax (hereinafter referred to as "SGST") or Union Territory Goods and Services Tax (hereinafter referred to as "UTGST") depending upon the import/interstate or intrastate supplies, as the case may be. It shall also mean GST compensation Cess, if applicable.

12.4.2 Where the OIL is entitled to avail the input tax credit of GST:

OIL will reimburse the GST to the Supplier of Goods/Services (Service Provider) at actual against submission of Invoices as per format specified in rules/regulation of GST to enable OIL to claim input tax credit of GST paid. In case of any variation in the executed quantities, the amount on which the GST is applicable shall be modified in same proportion. Returns and details required to be filled under GST laws &rules should be timely filed by supplier with requisite details.

12.4.3 Where the OIL is not entitled to avail/take the full input tax credit of GST:

OIL will reimburse GST to the Supplier of Goods/Services (Service Provider) at actual against submission of Invoices as per format specified in rules/regulation of GST subject to the ceiling amount of GST as quoted by the bidder. In case of any variation in the executed quantities (If directed and/or certified by the In-Charge) the ceiling amount on which GST is applicable will be modified on pro-rata basis.

12.4.4 The CONTRACTOR will be under obligation for charging correct rate of tax as prescribed under the respective tax laws. Further the CONTRACTOR shall avail and pass on benefits of all exemptions/concessions available under tax laws. Any error of interpretation of applicability of taxes/duties by the CONTRACTOR shall be to CONTRACTOR's account.

12.4.5 In case of statutory variation in GST, other than due to change in turnover, payable on the contract value during contract period, the Supplier of Goods/Services (Service Provider) shall submit a copy of the 'Government Notification' to evidence the rate as applicable on the Bid due date and on the date of revision.

12.4.6 Beyond the contract period, in case OIL is not entitled for input tax credit of GST, then any increase in the rate of GST beyond the contractual delivery period shall be to Service provider's account whereas any decrease in the rate GST shall be passed on to the OIL.

12.4.7 Beyond the contract period, in case OIL is entitled for input tax credit of GST, then statutory variation in applicable GST on supply and on incidental services, shall be to OIL's account.

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

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

12.4.10 The CONTRACTOR will be liable to ensure to have registered with the respective tax authorities, wherever applicable and to submit self- attested copy of such registration certificate(s) and the CONTRACTOR will be responsible for procurement of material in its own registration (GSTIN) and also to issue its own Road Permit/E-way Bill, if applicable etc.

12.5 Anti-profiteering clause

12.5.1 As per Clause 171 of GST Act it is mandatory to pass on the benefit due to reduction in rate of tax or from input tax credit to the consumer

by way of commensurate reduction in prices.

12.5.2 In case rating of Contractor is negative/black listed after award of work for supply of goods/services, then OIL shall not be obligated or liable to pay or reimburse GST to such vendor/Contractor and shall also be entitled to deduct/recover such GST along with all penalties/interest, if any, incurred by OIL.

13.0 CUSTOMS DUTY, IF APPLICABLE:

13.1.1 CONTRACTOR shall be responsible to import the equipment/tools/spares/consumables etc. required for execution of the contract. The CONTRACTOR shall undertake to complete all the formalities as required under the Customs Act/Foreign Trade Policy (FTP) and indemnify OIL from all the liabilities of Customs in this regard.

13.1.2 CONTRACTOR will be solely responsible for payment of all applicable Customs Duty and to comply all Rules and Regulations. Total Contract Price/Value is inclusive of all Customs Duty, if not mentioned otherwise elsewhere in the Contract.

13.1.3 Above clause is to be read with Customs Duty Clause in SCC, if any.

14.0 INSURANCE:

14.1 The Contractor shall at its own expense arrange secure and maintain insurance with reputed insurance companies to the satisfaction of the Company as follows:

a) The Contractor shall, at his own expense, arrange appropriate comprehensive insurance (All-risks insurance cover with suitable limit as per International Standard) to cover all risks assumed by the Contractor under this Contract in respect of its equipment, tools including but not limited to well equipment & tools, any other belongings and personnel during the entire period of this Contract including extensions thereof.

b) The Contractor shall also carry adequate insurance cover against damage/loss to third party/person/property.

c) The Contractor at his cost shall arrange, secure and maintain insurance as may be necessary and to its full value for all such amounts to protect the works-in-progress from time to time and the interest of Company against all risks as detailed herein subject to the satisfaction of the Company and irrespective of acceptance of the Work.

d) The responsibility to maintain adequate insurance coverage at all times during the period of the Contract shall be that of the Contractor alone and OIL will have no liability on this account. The Contractor's failure in this

regard shall not relieve him of any of his responsibilities & obligations under the Contract.

e) All costs on account of insurance liabilities covered under the Contract will be to the Contractor's account.

14.2 Deductible:

The Contractor shall take policy with minimum deductible as per IRDA prescribed for the policy(ies) that portion of any loss not covered by the insurance provided for in this article solely by reason of a deductible provision in such insurance policies that shall be the account of the Contractor.

14.3 The Contractor shall require all of its sub-Contractor to provide such of the foregoing insurance coverage as Contractor is obliged to provide under this Contract and inform the Company about the coverage prior to the commencement of agreements with its sub-Contractors.

14.4 All insurance taken out by Contractor, or their sub-contractor shall be endorsed to provide that the underwriters waive their rights of recourse on the Company and to the extent of the liabilities assumed by Contractor under this Contract.

14.5 Waiver of subrogation:

All insurance policies of the Contractor and its Sub-Contractor with respect to the operations conducted hereunder as set forth in clauses hereof, shall be endorsed by the underwriter in accordance with the following policy wording:

"The insurers hereby waive their rights of subrogation against Oil India Limited or any of their employees or their affiliates and assignees."

14.6 Loss Payee Clause:
The Insurance Policies should mention the following in Loss Payee Clause:

“In respect of Insurance claims in which OIL’s interest is involved, written consent of OIL will be required”.

14.7 Additional Assured:

“Oil India Limited” is to be included as Additional Assured in the Insurance Policies (except in case of Workmen’s Compensation/Employer’s Liability insurance).

14.8 Certificate of Insurance:

Before commencing performance of the CONTRACT, CONTRACTOR

shall furnish OIL with certificates of insurance indicating:

a) Kinds and amounts of insurance as required herein
b) Details of coverage
c) Insurance corporation or companies carrying the aforesaid coverage
d) Effective and expiry dates of policies
e) That OIL shall be given thirty (30) days written advance notice of any material change in the policy
f) Waiver of subrogation endorsement has been attached to all policies and

Note: An undertaking by the service provider has to be mandatorily provided during the Mobilization time that they have taken all the Insurance provisions as per the contract and as the Law and Insurance Regulation.

14.9 If any of the above policy expire or/are cancelled during the term of this CONTRACT and CONTRACTOR fails for any reason to renew such policies, OIL in no case shall be liable for any loss/damage occurred during the term when the policy is not effective. Furthermore, a penal interest @ 1% of the Total contract value shall be charged towards not fulfilling of the contractual obligations. Notwithstanding above, should there be a lapse in any insurance required to be taken by the Contractor for any reason whatsoever, loss/damage claims resulting therefrom shall be to the sole account of Contractor.

14.10 The Contractor on demand from the Company shall furnish the Insurance Policy having detail terms and conditions, with respect to any Certificate of Insurance submitted to the Company.

14.11 On account payment to OIL in case of claim

In case any loss or damage happen and where Company's interest is involved, The Company reserves the right to recover the loss amount from the Contractor prior to final settlement of the claim.

14.12 The CONTRACTOR shall at all time during the currency of the contract provide, pay for and maintain the following insurance amongst others:

i) **Employees Compensation (EC) Policy or Employer's Liability Policy insurance as required by the laws of the country of origin of the employee.**

ii) **Commercial General Liability Insurance:** Commercial General Public Liability Insurance covering liabilities including contractual liability for bodily injury, including death of persons, and liabilities for damage of property. This insurance must cover all operations of CONTRACTOR required to fulfil the provisions under this Contract.

iii) **Comprehensive General Automotive Liability:** Automobile Public Liability Insurance covering owned, non-owned and hired automobiles used in the performance of the work hereunder, with bodily injury limits and property damage limits shall be governed by Indian Insurance

Regulations.

iv) **Carrier's Legal Liability Insurance:** Carrier's Legal Liability Insurance in respect of **all CONTRACTOR's items** to be transported by the CONTRACTOR to the site of work, for physical loss or destruction of or damage to goods or merchandise, while in transit.

v) **Public Liability Act Policy:** Public Liability Act Policy, if applicable, covering the statutory liability arising out of accidents occurring during the currency of the contract due to handling hazardous substances as provided in the Public Liability Insurance Act 1991 and the Rules framed there under. In case there is no usage of hazardous substance, the Contractor should provide an undertaking during mobilization as per format enclosed regarding non-inclusion of hazardous substances within the ambit of the contract.

vi) **Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY):** CONTRACTOR shall, ensure that all his/its personnel deployed under this contract have obtained additional insurance coverage under the Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) through the participating banks and submit the proof of such insurance coverage to the satisfaction of OIL.
Note: This will be applicable for only Indian citizens and within the prescribed age group defined under the scheme for the insurance coverage.

vii) **Any other insurance policy set forth in the SCC**

15.0 LIABILITY:

15.1 Except as otherwise expressly provided herein, neither COMPANY nor its servants, agents, nominees, CONTRACTORs, or sub-CONTRACTORs shall have any liability or responsibility whatsoever to whomsoever for loss of or damage to the equipment and/or loss of or damage to the property of the CONTRACTOR and/or their CONTRACTORs or sub-CONTRACTORs, irrespective of how such loss or damage is caused and even if caused by the negligence of COMPANY and/or its servants, agent, nominees, assignees, CONTRACTORs and sub-CONTRACTORs.

15.2 The CONTRACTOR shall protect, defend, indemnify and hold harmless COMPANY from and against such loss or damage and any suit, claim or expense resulting there from. Neither COMPANY nor its servants, agents, nominees, assignees, CONTRACTORs, sub-CONTRACTORs shall have any liability or responsibility whatsoever for injury to, illness, or death of any employee of the CONTRACTOR and/or of its CONTRACTORs or sub-CONTRACTOR irrespective of how such injury, illness or death is caused and even if caused by the negligence of COMPANY and/or its servants, agents nominees, assignees, CONTRACTORs and sub-CONTRACTORs. CONTRACTOR shall protect, defend, indemnify and hold harmless COMPANY from and against such liabilities and any suit, claim or expense resulting there from.

15.3 The CONTRACTOR hereby agrees to waive its right of recourse and further agrees to cause its underwriters to waive their right of subrogation against COMPANY and/or its underwriters, servants, agents, nominees, assignees, CONTRACTORs and sub-CONTRACTORs for loss or damage to the equipment of the CONTRACTOR and/or its sub-CONTRACTORs and/or their employees when such loss or damage or liabilities arises out of or in connection with the performance of the contract limited to the CONTRACTOR's liabilities agreed to under this Contract.

15.4 The CONTRACTOR hereby further agrees to waive its right of recourse and agrees to cause its underwriters to waive their right of subrogation against COMPANY and/or its underwriters, servants, agents, nominees, assignees, CONTRACTORs and sub-CONTRACTORs for injury to, illness or death of any employee of the CONTRACTOR and of its CONTRACTORs, sub-CONTRACTORs and/or their employees when such injury, illness or death arises out of or in connection with the performance of the contract limited to the CONTRACTOR's liabilities agreed to under this Contract.

15.5 Except as otherwise expressly provided herein, neither CONTRACTOR nor its servants, agents, nominees, CONTRACTORs or sub- CONTRACTORs shall have any liability or responsibility whatsoever to whomsoever for loss of or damage to the equipment and/or loss or damage to the property of the COMPANY and/or their CONTRACTORs or sub-CONTRACTORs, irrespective of how such loss or damage is caused and even if caused by the negligence of CONTRACTOR and/or its servants, agents, nominees, assignees, CONTRACTORs and sub- CONTRACTORs. The COMPANY shall protect, defend, indemnify and hold harmless CONTRACTOR from and against such loss or damage and any suit, claim or expense resulting there from.

15.6 Except as otherwise expressly provided herein, neither CONTRACTOR nor its servants, agents, nominees, assignees, CONTRACTORs, sub-CONTRACTORs shall have any liability or responsibility whatsoever to whomsoever for injury or illness, or death of any employee of the COMPANY and/or of its CONTRACTORs or sub- CONTRACTORs irrespective of how such injury, illness or death is caused and even if caused by the negligence of CONTRACTOR and/or its servants, agents, nominees, assignees, CONTRACTORs and sub-CONTRACTORs. COMPANY shall protect, defend indemnify and hold harmless CONTRACTOR from and against such liabilities and any suit, claim or expense resulting there from.

15.7 The COMPANY agrees to waive its right of recourse and further agrees to cause its underwriters to waive their right of subrogation against CONTRACTOR and/or its underwriters, servants, agents, nominees, assignees, CONTRACTORs and sub- CONTRACTORs for loss or damage to the equipment of COMPANY and/or its CONTRACTORs or

sub-CONTRACTORs when such loss or damage or liabilities arises out of or in connection with the performance of the contract.

15.8 The COMPANY hereby further agrees to waive its right of recourse and agrees to cause it underwriters to waive their right of subrogation against CONTRACTOR and/or its underwriters, servants, agents, nominees, assignees, CONTRACTORs and sub- CONTRACTORs for injury to, illness or death of any employee of the COMPANY and of its CONTRACTORs, sub-CONTRACTORs and/or their employees when such injury, illness or death arises out of or in connection with the performance of the Contract.

16.0 LIMITATION OF LIABILITY:

a) Notwithstanding any other provisions herein to the contrary, except only in cases of Willful misconduct and/or criminal acts and/or criminal negligence, neither the CONTRACTOR nor the COMPANY (OIL) shall be liable to the other, whether in Contract, tort, or otherwise, for any consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided however that this exclusion shall not apply to any obligation of the CONTRACTOR to pay Liquidated Damages to the COMPANY and/or COMPANY's right to forfeit the Performance Bank Guarantee(s) in terms of the contract.

b) Notwithstanding any other provisions incorporated elsewhere in the contract, the aggregate liability of the CONTRACTOR in respect of this contract, whether under Contract, in tort or otherwise, shall not exceed 100% of the Contract Price (if not specified otherwise in SCC), provided however that this limitation shall not apply to the cost of repairing or replacing defective equipment by the CONTRACTOR, or to any obligation of the CONTRACTOR to indemnify the COMPANY with respect to Intellectual Property Rights.

c) COMPANY shall indemnify and keep indemnified CONTRACTOR harmless from and against any and all claims, costs, losses and liabilities in excess of the aggregate liability amount in terms of clause (b) above.

17.0 LIABILITY OF UNION GOVERNMENT OF INDIA:

It is expressly understood and agreed upon by and between CONTRACTOR and OIL INDIA LIMITED, and that OIL INDIA LIMITED is entering into this agreement solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood and agreed that Union of India is not a party to this agreement and has no liabilities, obligations or rights, whatsoever hereunder. It is expressly understood and agreed that OIL INDIA LIMITED is an independent legal entity with power and authority to enter into contracts solely on its own behalf under the applicable laws of India and general principles of the Contract law. The bidder/CONTRACTOR expressly agrees, acknowledges

and understands that OIL INDIA LIMITED is not an agent, representative or delegate of the Union of India. It is further understood and agreed that Union of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the contract. Accordingly, bidder/CONTRACTOR hereby expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Union of India arising out of this contract and covenants not to sue the Union of India as to any manner, claim, cause of action or thing whatsoever arising of or under this agreement.

18.0 CONSEQUENTIAL DAMAGE:

Except as otherwise expressly provided, neither party shall be liable to the other for special, indirect or consequential damages resulting from or arising out of the contract, including but without limitation, to loss or profit or business interruptions, howsoever caused and regardless of whether such loss or damage was caused by the negligence (either sole or concurrent) of either party, its employees, agents or sub-CONTRACTORs.

19.0 RISK PURCHASE:

In the event, CONTRACTOR's failure to provide the services as per the Contractual scope, terms and conditions, COMPANY (OIL) reserves the right to hire the services from any other source at the CONTRACTOR's risk & cost and the difference in cost shall be borne by the CONTRACTOR. Further, OIL shall retain the right of forfeiture of Performance Bank Guarantee and any other action as deemed fit. In certain operational situations OIL reserves the right to take over the site including the service equipment at the risk and cost of the CONTRACTOR.

20.0 INDEMNITY AGREEMENT:

20.1 Except as provided hereof CONTRACTOR agrees to protect, defend, indemnify and hold COMPANY harmless from and against all claims, suits, demands and causes of action, liabilities, expenses, cost, liens and judgments of every kind and character, without limit, which may arise in favour of CONTRACTOR's employees, agents, CONTRACTORs and sub-CONTRACTORs or their employees or in favour of any third party(is) on account of bodily injury or death, or damage to personnel/property as a result of the operations contemplated hereby, regardless of whether or not said claims, demands or causes of action arise out of the negligence or otherwise, in whole or in part or other faults.

20.2 Except as provided hereof COMPANY agrees to protect, defend, indemnify and hold CONTRACTOR harmless from and against all claims, suits, demands and causes of action, liabilities, expenses, cost, liens and judgments of every kind and character, without limit, which may arise in

favour of COMPANY's employees, agents, CONTRACTORs and sub-CONTRACTORs or their employees or in favour of any third party(is) on account of bodily injury or death, or damage to personnel/property as a result of the operations contemplated hereby, regardless of whether or not said claims, demands or causes of action arise out of the negligence or otherwise, in whole or in part or other faults.

21.0 INDEMNITY APPLICATION:

The indemnities given herein above, whether given by COMPANY or CONTRACTOR shall be without regard to fault or to the negligence of either party even though said loss, damage, liability, claim, demand, expense, cost or cause of action may be caused, occasioned by or contributed to by the negligence, either sole or concurrent of either party.

22.0 ROYALTY PATENTS:

Each party shall hold harmless and indemnify the other from and against all claim and proceedings for or on account of any patent rights, design, trademark or other protected rights arising from any use of materials, equipment, processes, inventions and methods, which have not been imposed on the attending party by the terms of the contract or the specifications forming part thereof.

23.0 WARRANTY AND REMEDY OF DEFECTS:

23.1 CONTRACTOR warrants that they shall perform the work in a first class, workmanlike, and professional manner and in accordance with their highest degree of quality, efficiency and current state of the art technology/industry practices and in conformity with all specifications, standards and drawings set forth or referred to in the Terms of Reference and with instructions and guidance, which COMPANY may, from time to time, furnish to the CONTRACTOR.

23.2 Should COMPANY discover at any time during the tenure of the Contract or till the Unit/equipment/tools are demobilized from site or base camp (if applicable) that the work does not conform to the foregoing warranty, CONTRACTOR shall after receipt of notice from COMPANY, promptly perform any and all corrective work required to make the services conform to the Warranty. Such corrective Work shall be performed entirely at CONTRACTOR's own expenses. If such corrective Work is not performed within a reasonable time, the COMPANY, at its option may have such remedial Work performed by others and charge the cost thereof to CONTRACTOR subject to a maximum of the contract value payable for the defective work which needs corrective action which the CONTRACTOR must pay promptly. In case CONTRACTOR fails to perform remedial work, or pay promptly in respect thereof, the performance security shall be forfeited.

24.0 SUBCONTRACTING/ASSIGNMENT:

24.1 CONTRACTOR shall not subcontract, transfer or assign the contract, or any part under this contract, to any third party(ies). Except for the main services under this contract, CONTRACTOR may sub-contract the petty support services subject to COMPANY's prior written approval. However, CONTRACTOR shall be fully responsible for complete execution and performance of the services under the Contract.

24.2 Consequent upon of placement of contract, if successful bidder(s)(other than Micro/Small Enterprise) is procuring materials/services from their sub-vendor, who is a Micro or Small Enterprise registered with District Industry Centers or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts and Handloom or any other body specified by Ministry of MSME with prior consent in writing of the purchasing authority/Engineer in Charge the details like Name, Registration No., Address, Contact No., details of material and value of procurement made, etc. of such enterprises shall be furnished by the CONTRACTOR at the time of submission of invoice/bill.

25.0 RECORDS, REPORTS AND INSPECTION:

The CONTRACTOR shall, at all times during the currency of the contract, permit the COMPANY and its authorized employees and representatives to inspect all the Work performed and to witness and check all the measurements and tests made in connection with the said work. The CONTRACTOR shall keep an authentic, accurate history and logs including safety records of each service item with major items consumed, which shall be open at all reasonable times for inspection by the COMPANY's designated representatives and its authorized employees. The CONTRACTOR shall provide the COMPANY's designated representatives with a daily written report, on form prescribed by the COMPANY showing details of operations during the preceding 24 hours and any other information related to the said services requested by the COMPANY whenever so requested. The CONTRACTOR shall not, without COMPANY's written consent allow any third person(s) access to the said information or give out to any third person information in connection therewith.

26.0 CONFIDENTIALITY, USE OF CONTRACT DOCUMENTS AND INFORMATION:

26.1 CONTRACTOR shall not, without COMPANY's prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing pattern, sample or information furnished by or on behalf of COMPANY in connection therewith, to any person other than a person employed by CONTRACTOR in the performance of the contract.

Disclosure to any such employed person shall be made in confidence and shall extend only, as may be necessary for purposes of such performance with prior permission from COMPANY. However, nothing hereinabove contained shall deprive the CONTRACTOR of the right to use or disclose any information which is:

a) possessed by the CONTRACTOR, as evidenced by the CONTRACTOR's written records, before receipt thereof from the COMPANY which however the CONTRACTOR shall immediately inform to COMPANY; or

b) required to be disclosed by the CONTRACTOR pursuant to an order of a court of competent jurisdiction or other governmental agency having the power to order such disclosure, provided the CONTRACTOR uses its best efforts to provide timely notice to COMPANY of such order to permit COMPANY an opportunity to contest such order subject to prior permission from COMPANY.

26.2 CONTRACTOR shall not, without COMPANY's prior written consent, make use of any document or information except for purposes of performing the contract.

26.3 Any document supplied to the CONTRACTOR in relation to the contract other than the Contract itself remain the property of COMPANY and shall be returned (in all copies) to COMPANY on completion of CONTRACTOR's performance under the Contract if so required by COMPANY.

26.4 During the currency of the Contract, COMPANY and its employees, agents, other CONTRACTORs, sub-CONTRACTORs (of any tier) and their employees etc. may be exposed to certain confidential information and data of the CONTRACTOR. Such information and data held by the COMPANY, its employees, agents, other CONTRACTORs, sub-CONTRACTORs (of any tier) and their employees in the strictest Confidence and shall not be disclosed to any other party except on a need-to-know basis.

However, the above obligation shall not extend to information which:

i) is, at the time of disclosure, known to the public which CONTRACTOR shall immediately inform COMPANY;

ii) is lawfully becomes at a later date known to the public through no fault of CONTRACTOR subject to CONTRACTOR's undertaking that no information has been divulged by them to the public;

iii) is lawfully possessed by CONTRACTOR before receipt thereof from COMPANY which should be immediately informed to COMPANY;

iv) is developed by CONTRACTOR independently of the information disclosed by COMPANY which should be shared with the COMPANY;

v) CONTRACTOR is required to produce before competent authorities or by court order subject to prior permission from COMPANY;

27.0 REMUNERATION AND TERMS OF PAYMENT:

27.1 COMPANY shall pay to the CONTRACTOR during the term of the Contract the amount due from time to time calculated according to the rates of payment set and in accordance with other provisions hereof. No other payments shall be due from COMPANY unless specifically provided for in the Contract. All payments will be made in accordance with the terms hereinafter described.

27.2 Request for payment/part payment to third party i.e. other than the party on whom the contract has been awarded will not be entertained by OIL under any circumstances.

27.3 MANNER OF PAYMENT: All payments due by COMPANY to CONTRACTOR hereunder shall be made at CONTRACTOR's designated bank. Bank charges, if any will be on account of the CONTRACTOR.

27.4 Payment of any invoices shall not prejudice the right of COMPANY to question the validity of any charges therein, provided COMPANY within one year after the date of payment shall make and deliver to CONTRACTOR written notice of objection to any item or items the validity of which COMPANY questions.

27.5 INVOICES: Mobilization charges will be invoiced only upon completion of mobilization as certified by COMPANY representative and CONTRACTOR is ready at site for starting the services/operation. Payment of mobilization charges shall be made within 45 days following the date of receipt of undisputed invoices by COMPANY.

27.6 CONTRACTOR shall send invoice to COMPANY on the day following the end of each month for all daily or monthly charges due to the CONTRACTOR.

27.7 CONTRACTOR will submit 02 (Two) sets of all invoices duly super scribed `Original' and `copy' as applicable to the COMPANY for processing payment. Separate invoices for the charges payable under the contract shall be submitted by the CONTRACTOR for foreign currency and Indian currency.

27.8 Payment of monthly invoices, if undisputed, shall be made within 30 days following the date of receipt of invoice by COMPANY.

27.9 COMPANY shall within 30 days of receipt of the invoice notify the CONTRACTOR of any item under dispute, specifying the reasons thereof, in which event, payment of the disputed amount may be withheld until settlement of the dispute, but payment shall be made of any undisputed portion on or before the due date. This will not prejudice the COMPANY's right to question the validity of the payment at a later date as envisaged in clause no. **27.4** above.

27.10 The acceptance by CONTRACTOR of part payment on any billing not paid on or before the due date shall not be deemed a waiver of CONTRACTOR's rights in any other billing, the payment of which may then or thereafter be due.

27.11 Payment of Final demobilization charges shall be made if applicable within 45 days on receipt of invoice by COMPANY accompanied by the following documents from the CONTRACTOR:

a) Audited account up to completion of the Contract.

b) Tax audit report for the above period as required under the Indian Tax Laws.

c) Documentary evidence regarding the submission of returns and payment to taxes for the expatriate personnel engaged by the CONTRACTOR or by its sub- CONTRACTOR.

d) Proof of re-export of all items including the unutilized spares and consumables (excepting consumables consumed during the contract period) and also cancellation of re-export bond if any.

e) Any other documents as required by applicable Indian Laws.

In case, no demobilization charges are payable, the documents mentioned above will have to be submitted by the CONTRACTOR before release of the final payment by the COMPANY. A certificate from Chartered Accountant on (a), (b) & (c) above will suffice.

27.12 CONTRACTOR shall maintain complete and correct records of all information on which CONTRACTOR's invoice are based upto 02 (two) years from the date of last invoice. Such records shall be required for making appropriate adjustments or payments by either party in case of subsequent audit query/objection.

28.0 PAYMENT OF COMMISSION/FEE/REMUNERATION OF INDIAN AGENT/CONSULTANT/REPRESENTATIVE/RETAINER/ASSOCIATE OF FOREIGN PRINCIPAL (APPLICABLE IN ICB TENDERS ONLY):

The Commission/Fee/remuneration of the Indian agent/consultant/associate/representative/retainer, if any, will be paid within 30 days of the payment of invoice made to the CONTRACTOR, The amount of commission/fee/remuneration as a percentage of invoice value as per contract provisions will be deducted by COMPANY/OIL from the monthly invoices of the CONTRACTOR and paid to the Indian agent/consultant/representative/retainer/associate.

29.0 DETAILS OF STATUTORY PAYMENTS LIKE EPF AND ESI, ETC:

Wherever applicable, the CONTRACTOR (including those engaging 'International Workers') shall have itself registered under Employees'

Provident Fund and Miscellaneous Provisions Act, 1952 and Employees' State Insurance Act, 1948 and follow the relevant statutory provisions including Rules made there-under concerning contractual workers.

The CONTRACTOR shall be required to submit the following documents/details to the Corporation:

(i) Copy of PF-ECR duly stamped by the designated Bank, alongwith a print of the digitally signed PDF data sheet of the ECR, as proof of payment, each month, details of this PDF data sheet shall be verified by the appropriate authority (i.e. Payment Making Authority) in the COMPANY from the official website of EPFO (http://www.epfindia.gov.in).

(ii) (a) Copy of the online challan endorsed/stamped by the designated bank as proof of receipt of payment towards monthly contribution of ESI contribution.

(b) Copy of Return of contribution in respect of ESI for each contribution period of the six months i.e. for the contribution period ended 30th Sept and the contribution period ended 31st March.

(iii) As an Annexure to each EPF-ECR and ESI Challan(s), CONTRACTOR shall also furnish the following Certificates:

1) The furnished information is correct to the best of his knowledge.

2) In case any discrepancies or irregularities is/are noticed in this undertaking, then OIL is free to inform the PF/ESIC Authorities.

3) Before the completion of contract, CONTRACTOR shall serve one-month notice to all his contractual workers, informing that their services will be terminated.

4) Within one month on completion/expiry of the contract, CONTRACTOR shall pay all the dues/terminal dues such as leave with wages, bonus (if applicable), Gratuity (if applicable), to all his contractual workmen, failing which CONTRACTOR's Bank Guarantee/Security Deposit may be withheld by OIL.

COMPANY may verify the deposit of statutory contribution made by the CONTRACTORs with the EPFO/ESI authorities, where deemed necessary. However, before making payment of the last bill/invoice of the CONTRACTOR, the COMPANY may verify the details/status of the payment towards EPF/ESI made by the CONTRACTOR from the authorities/official website of EPF/ESI (i.e. http://www.epfindia.gov.in and http://www.esic.in). In case the information furnished by the CONTRACTOR is found to be incorrect the COMPANY shall take appropriate action against the CONTRACTOR in accordance with law.

The CONTRACTOR agrees and undertakes to indemnify OIL for any

liabilities arising out of declarations made by him in future on violation or provisions of the EPF Act 1952 and ESI Act 1948.

30.0 TIMELY MOBILIZATION AND LIQUIDATED DAMAGES:

a) Time is the essence of this Contract. If the CONTRACTOR fails to mobilize and deploy the required manpower/equipment and/or fails to commence the operation within the period specified as specified under mobilization clause under SCC, OIL shall have, without prejudice to any other right or remedy in law or contract including sub clause (b) below, the right to terminate the contract.

b) If the contractor is unable to mobilize/deploy and commence the operation within the period specified in sub clause (a) above, it may request OIL for extension of the time with unconditionally agreeing for levy and recovery of LD. Upon receipt of such a request, OIL may at its discretion, extend the period of mobilization and shall recover from the CONTRACTOR, as an ascertained and agreed Liquidated Damages, a sum equivalent to @ 0.5% of contract value including mobilization cost, per week or part thereof of delay subject to maximum of 7.5% of the Contract Price.

c) 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 OIL on account of delay on the part of the CONTRACTOR and the said amount will be payable without proof of actual loss or damage caused by such delay.

d) LD will be calculated on the basis of Total Contract value [(if not specified otherwise in SCC] excluding duties and taxes, where such duties/taxes have been shown separately in the contract. However, the applicable GST on the LD shall have to be borne by the CONTRACTOR. Accordingly, the liquidated damages shall be recovered from the CONTRACTOR along with applicable GST.

31.0 FORCE MAJEURE:

In the event of either party being rendered unable by `Force Majeure' to perform any obligation required to be performed by them under the contract, the relative obligation of the party affected by such `Force Majeure' will stand suspended as provided herein. The term force majeure as employed herein shall mean Acts of God such as earthquake, hurricane, typhoon, flood, volcanic activity etc.; war (declared/undeclared); riot, revolts, rebellion, terrorism, sabotage by persons other than the CONTRACTOR’s Personnel; fires, explosions, ionising radiation or contamination by radio-activity or noxious gas, if not caused by CONTRACTOR's fault; declared epidemic or disaster; acts and regulations of respective Govt. of the two parties, namely the COMPANY and the CONTRACTOR and civil commotions, lockout not attributable to the CONTRACTOR.

Upon occurrence of such cause, the party claiming that it has been rendered unable as aforesaid thereby, shall notify the other party in writing within 72 (Seventy-Two) hours of the alleged beginning and ending thereof, giving full particulars and satisfactory evidence in support of its claim.

Should 'force majeure' condition as stated above occurs and should the same be notified within 72 (Seventy-two) hours after its occurrence the `force majeure' rate (if specified in the SCC of the Contract) shall apply for the first 15 (fifteen) days for each such occasion.

Either party shall have the right to terminate the Contract if such `force majeure' conditions continue beyond successive 60 (Sixty) days [or exclusively mentioned in the SCC of the Contract] with prior written notice of 15 days, provided termination of the Contract does not result into safety hazard to the life and property on account of withdrawal of operations or the operation is at critical stage. COMPANY shall have the absolute right to decide whether any safety hazard exists, or operation is at critical position and decision of the COMPANY shall binding upon the CONTRACTOR.

Should either party decide not to terminate the Contract even under such condition, no payment would apply after expiry of fifteen (15) days force majeure period**.** [or exclusively mentioned in the SCC of the Contract]

Time for performance of the relative obligation suspended by Force Majeure shall then stand extended by the period for which such cause lasts.

If however, relative obligation of the party affected by such 'Force Majeure' is limited to part of the obligation(s), the contract shall not be terminated and the parties shall continue to perform their respective obligations, which are not affected by the 'force majeure' condition, provided the obligations affected by the 'force majeure' do not preclude the parties in performing the obligations not affected by such conditions.

32.0 SET-OFF:

Any sum of money due and payable to the CONTRACTOR (including Performance Security refundable to them) under this or any other Contract, whether in progress or in future, may be appropriated by OIL and set-off against any claim of OIL (or such other person or persons contracting through OIL) for payment of a sum of money arising out of this contract or under any other contract made by the CONTRACTOR with OIL (or such other person or persons contracting through OIL).

33.0 WITHHOLDING:

COMPANY may withhold or nullify the whole or any part of the amount due to CONTRACTOR, after informing the CONTRACTOR of the reasons in writing, on account of subsequently discovered evidence in order to protect COMPANY from loss on account of:

33.1 For non-completion of jobs assigned as per Scope of Work/Terms of Reference.

33.2 Defective work not remedied by CONTRACTOR.

33.3 Claims by COMPANY's recognized sub-CONTRACTOR of CONTRACTOR or others filed or on the basis of reasonable evidence indicating probable filing of such claims against CONTRACTOR.

33.4 Failure of CONTRACTOR to pay or provide for the payment of salaries/ wages, contributions, taxes or enforced savings with-held from wages etc. with respect to personnel engaged by the CONTRACTOR.

33.5 Failure of CONTRACTOR to pay the cost of removal of unnecessary debris, materials, tools, or machinery.

33.6 Any failure by CONTRACTOR to fully reimburse COMPANY under any of the indemnification provisions of this Contract. If, during the progress of the work CONTRACTOR shall allow any indebtedness to accrue for which CONTRACTOR, under any circumstances in the opinion of COMPANY, may be primarily or contingently liable or ultimately responsible and CONTRACTOR shall, within five days after demand is made by COMPANY, fail to pay and discharge such indebtedness, then COMPANY may during the period for which such indebtedness shall remain unpaid, with-hold from the amounts due to CONTRACTOR, a sum equal to the amount of such unpaid indebtedness.

33.7 Withholding will also be affected on account of the following:

i) Order issued by a Court of Law or statutory authority in India.

ii) Income-tax deductible at source according to law prevalent from time to time in the country.

iii) Any obligation of CONTRACTOR which by any law prevalent from time to time to be discharged by COMPANY in the event of CONTRACTOR's failure to adhere to such laws.

iv) Any payment due from CONTRACTOR in respect of unauthorized imports.

When all the above grounds for withholding payments are removed, payment shall thereafter be made for amounts so with-held.

33.8 COMPANY reserves the right to disburse or deposit the amount so withheld to the concerned person(s) or agency or government authority, as the case may be, besides nullifying such amount on account of loss suffered by the COMPANY against **33.2, 33.3, 33.6** & **33.7** above.

34.0 APPLICABLE LAWS:

The Contract shall be deemed to be a Contract made under, governed by and construed in accordance with the laws of India for the time being in force and shall be subject to the sole and exclusive jurisdiction of Courts situated in Dibrugarh (or the Place where the contract is executed) and Principal Bench of Gauhati High Court (or the High Court under whose territorial jurisdiction, the place of execution of contract falls).

This Agreement including all matter connected with this Agreement, shall be governed by the laws of India (both substantive and procedural) for the time being in force and shall be subject to exclusive jurisdiction of Courts, mentioned hereinabove. Foreign companies, operating in India or entering into Joint ventures in India, shall also be governed by the laws of India and shall be subject to sole and exclusive jurisdiction of above Courts.

The CONTRACTOR shall ensure full compliance of various Indian Laws and Statutory Regulations, as stated below, to the extent applicable, as stated below, but not limited to, in force from time to time and obtain necessary permits/licenses etc. from appropriate authorities for conducting operations under the Contract:

a) The Mines Act 1952
b) The Oil Mines Regulations, 1984
c) The Employees' Compensation Act, 1923
d) The Code of Wages, 2019
e) The Contract Labour (Regulation & Abolition) Act, 1970 and the rules framed there under
f) The Employees Pension Scheme, 1995
g) The Interstate Migrant Workmen Act., 1979 (Regulation of employment and conditions of service).
h) The Employees Provident Fund and Miscellaneous Provisions Act, 1952
i) Goods and Service Tax Act
j) Customs & Excise Act & Rules
k) Factories Act, 1948
l) Industrial Disputes Act, 1947
m) Payment of Gratuity Act, 1972
n) Environmental Protection Act, 1986 & other pollution control Acts.

Note: The above Acts are only indicative and not exhaustive. The Acts shall include the rules and regulations framed thereunder.

35.0 LABOUR LAWS:

i) CONTRACTOR shall comply with the provisions of various labour related laws, including but not limited to the Code of Wages, 2019, Employee Provident Fund and Miscellaneous Provisions Act 1952, COMPANY's Liability Act 1938, Employees' Compensation Act 1923, Industrial Disputes Act 1947, the Maternity Benefit Act 1961 and Contract Labour (Regulation and Abolition) Act 1970, Employment of Children Act 1938, Employees' State Insurance Act, 1948 or any modifications/amendment thereof or any other law relating thereto and rules made there under from time to time.

ii) No Labour below the age of eighteen [18] years shall be employed on the work.

iii) CONTRACTOR shall not pay less than what is provided under law to labourers engaged by him on the work.

iv) CONTRACTOR shall at his expense comply with all labour laws and keep the COMPANY indemnified in respect thereof.

v) CONTRACTOR shall pay equal wages for men and women in accordance with applicable Labour laws.

vi) If the CONTRACTOR is covered under the Contract Labour (Regulation and Abolition) Act, he shall obtain a license from licensing authority [i.e. office of the Labour Commissioner] by payment of necessary prescribed fee and the deposit, if any, before starting the work under the Contract. Such fee/deposit shall be borne by the CONTRACTOR.

vii) CONTRACTOR must obtain the PF Code from the concerned PF Authority under Employees Provident Fund and Miscellaneous Provisions Act, 1952. Similarly, CONTRACTOR must obtain ESI Code under Employees State Insurance Act.

viii) CONTRACTOR being the employer of the labours/personnel to be engaged under the contract shall be liable to pay gratuity to the labours/personnel as per the provision of the Payment of Gratuity Act, 1972 and accordingly, shall keep the COMPANY indemnified in respect thereof. If, however, COMPANY requires to pay gratuity to such labour(s) as per the direction of the competent authority under the Act, COMPANY shall recover such amount from the outstanding dues payable to the CONTRACTOR under the contract or any other contract(s).

ix) CONTRACTOR shall furnish to Engineer in Charge the distribution return of the number & description, by trades of the work people employed on the works. CONTRACTOR shall also submit on the 4th& 19th of every month to Engineer in Charge a true statement showing in respect of the 2nd half of the preceding month & the 1st half of the current month (1) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them and (2) the number of female workers who have been allowed Maternity Benefit as provided in the Maternity Benefit Act 1961 on Rules made there under and the amount paid to them.

x) Engineer in Charge shall on a report having been made by an inspecting officer as defined in Contract Labour (Regulation and Abolition) Act 1970

have the power to deduct from the money due to the CONTRACTOR any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfillment of the conditions of the Contract for the benefit of workers, non- payment of wages or of deductions made from his or their wages which are not justified by the terms of the Contract or non-observance of the said regulations.

xi) The CONTRACTOR shall indemnify the COMPANY against any payments to be made under and for the observance of the provisions of the aforesaid acts without prejudice to his right to obtain indemnity from his sub-CONTRACTOR.

36.0 STATUTORY REQUIREMENTS:

During the tenure of this CONTRACT nothing shall be done by the CONTRACTOR in contravention of any law, act and/or rules/regulations, thereunder or any amendment.

37.0 GENERAL HEALTH, SAFETY & ENVIRONMENT (HSE) GUIDELINES:

37.1 It will be solely the CONTRACTOR's responsibility to fulfil all the legal formalities with respect to the Health, Safety and Environmental aspects of the entire job (namely, the person employed by him, the equipment, the environment, etc.) under the jurisdiction of the district of that state where it is operating. Ensure that all sub-CONTRACTORs hired by CONTRACTOR comply with the same requirement as the CONTRACTOR himself and shall be liable for ensuring compliance all HSE laws.

37.2 It will be entirely the responsibility of the Contractor/his supervisor/representative to ensure strict adherence to all HSE measures and statutory rules during operation in OIL's installations and safety of workers engaged by him. The crew members will not refuse to follow any instruction given by company's Installation Manager/Safety Officer/Engineer/Official/Supervisor/Junior Engineer for safe operation.

37.3 Any compensation arising out of the job carried out by the Contractor whether related to pollution, Safety or Health will be paid by the contractor only.

37.4 Any compensation arising due to accident of the Contractor's personnel while carrying out the job, will be payable by the contractor.

37.5 When there is a significant risk to health, environment or safety of a person or place arising because of a non-compliance of HSE Measures Company shall have the right to direct the contractor to cease work until the non-compliance is corrected.

38.0 POLLUTION AND CONTAMINATION:

The CONTRACTOR shall be liable for all surface and sub-surface pollution to the extent caused by CONTRACTOR and resulting from CONTRACTOR's operation/service or spillage or dumping of solvents/additive substances or pollutants, which the CONTRACTOR brings to the Site for use in connection with Work to be performed under this Contract.

Notwithstanding anything to the contrary contained herein, it is agreed that except on the ground of willful misconduct or criminal misconduct, COMPANY shall release, indemnify and hold CONTRACTOR and its sub-CONTRACTORs harmless from any and all claims, judgments, losses, expenses and any costs related thereto (including but not limited to Court costs and "Attorney's fees") for:

a) Damage to or loss of any reservoir or producing formation; and/ or

b) Damage to or loss of any well; and/or

c) Any other subsurface damage or loss; and/or

d) Any property damage or loss or personal injury or death arising out of or in connection with a blowout, fire explosion and loss of well control regardless of cause.

39.0 STATUTORY VARIATION/NEWLY ENACTED LAW:

39.1 All duties, taxes except otherwise specified in the Contract as applicable on the closing date of bid submission as per relevant acts and rules shall be in CONTRACTOR's account. Variation in case of custom duty on CIF value declared by the bidder shall be to COMPANY account.

39.2 In the event of introduction of any new legislation or any amendment or enforcement of any Act or Law, rules or regulations of Government of India or State Government(s) or Public Body, which becomes effective after the date of submission of Price Bid or revised price bid, if any, for this CONTRACT and which results in increased/decreased cost of the works under the CONTRACT through increased/decreased liability of taxes and/or duties, required to be paid by the CONTRACTOR, (other than personnel and Corporate taxes), the Parties shall agree to a revision in pricing to reflect such change subject to the production of documentary proof to the satisfaction of the COMPANY/CONTRACTOR as applicable to the extent which directly is attributable to such introduction of new legislation or change or amendment as mentioned above and adjudication by the competent authority (applicable when disputed by COMPANY) & the courts wherever levy of such taxes/duties are disputed by COMPANY/CONTRACTOR.

39.3 Any increase in net amount of the duties and taxes (i.e. the amount of taxes/duties payable minus eligible credit of taxes/duties paid on input services/inputs) after the contractual completion/mobilization date during the extended period will be to the CONTRACTOR's account, where delay in completion/mobilization period is attributable to the CONTRACTOR. However, any decrease in net amount of the duties and taxes (i.e. the amount of taxes/duties payable minus eligible credit of taxes/duties paid on input services/inputs) after the contractual completion/mobilization date will be to COMPANY's account.

39.4 The Contract Price and other prices given in the Schedule of Prices are based on the applicable tariff as indicated by the CONTRACTOR in the Schedule of Prices. In case this information subsequently proves to be wrong, incorrect or misleading, COMPANY will have no liability to reimburse/pay to the CONTRACTOR the excess duties, taxes, fees, if any finally levied/imposed by the concerned authorities. However, in such an event, COMPANY will have the right to recover the difference in case the rate of duty/tax finally assessed is on the lower side.

39.5 Notwithstanding the provision contained in Clause-39.1 to 39.4 above, the COMPANY shall not bear any liability in respect of:

i. Personal taxes on the personnel deployed by CONTRACTOR, his sub-CONTRACTOR/sub-sub-CONTRACTORs and Agents etc.

ii. Corporate taxes and Fringe benefit tax in respect of CONTRACTOR and all of their sub-CONTRACTORs, agents etc.

iii. Other taxes & duties including Customs Duty and GST in addition to new taxes etc. in respect of sub-CONTRACTORs, vendors, agents etc. of the CONTRACTOR.

iv. Any liability on the CONTRACTOR, which was accrued under the old law or contract, which the CONTRACTOR is obligated to pay either to the COMPANY or to the Government Authority.

39.6 In order to ascertain the net impact of the amendment/ revisions/enactment of various provisions of taxes/duties, the CONTRACTOR is liable to provide following disclosure to COMPANY:

i. Details of each of the input services used in relation to providing service to COMPANY including estimated monthly value of input service and GST tax amount.

ii. Details of Inputs (material/consumable) used/required for providing service to COMPANY including estimated monthly value of input and GST paid/payable on purchase of inputs.

39.7 The above provisions would be applicable only in case of variation in rate of taxes and duties on supply of services to OIL and not applicable on taxes and duties on input (goods and services) towards such services.

39.8 Any claim or reduction on account of change in law shall be accompanied with undertaking that the provisions of anti- profiteering

clause under GST Act have been complied with.

40.0 SEVERABILITY:

Should any provision of this agreement be found to be invalid, illegal or otherwise not enforceable by any court of law, such finding shall not affect the remaining provisions hereto and they shall remain binding on the parties hereto.

41.0 COMMISSION OF MISCONDUCT/SUBMISSION OF FRAUDULENT DOCUMENT BY THE BIDDER/CONTRACTOR AND BANNING THEREOF:

The information and documents furnished by the bidder/CONTRACTOR in respect of the tender/contract are accepted by COMPANY to be true and genuine. However, if it comes to the notice of the COMPANY anytime either during the pendency of the tender or after award of the contract or after completion the contract that a Bidder/CONTRACTOR furnished fraudulent document/false information in relation to the subject tender/contract or committed any misconduct, appropriate action shall be taken against the Bidder/CONTRACTOR for debarment/banning of the bidder/CONTRACTOR from participating in any future tender of the COMPANY in terms of the COMPANY's Banning Policy dated 17th March, 2023 available in OIL's website: www.oil-india.com besides making the CONTRACTOR liable for other penal action including termination of ongoing contract(s) at his/her risk and peril. In such event, the Performance Security in respect of ongoing contract(s) shall be forfeited by the COMPANY.

42.0 SETTLEMENT OF DISPUTES:

42.1 If dispute of any kind whatsoever shall arise between the company 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 by mutual consultation. If the parties fail to resolve any such dispute or difference by mutual consultation, then the dispute may be settled through Settlement Advisory Committee (SAC). In the event, a dispute remains unsettled then Arbitration/other remedies available under the applicable laws may be availed by the Contractor. Resolution of Dispute through SAC:

a) OIL has framed the Conciliation Rules 2020 in conformity with Part III of the Arbitration and Conciliation Act 1996 as amended from time to time for speedier, cost effective and amicable settlement of disputes through conciliation.

b) If the parties fail to resolve such a dispute or difference by mutual consultation as per clause no. 42.1, the dispute, if the parties agree, may be referred to conciliation in accordance with OIL Conciliation Rules 2020 as amended from time to time. A copy of the said Rules has been made available on OIL's Website i.e. www.oil-india.com

c) Where the invitation for conciliation has been accepted by the other party, the parties shall attempt to settle such dispute(s) amicably under OIL conciliation Rules 2020.

d) Parties shall invoke arbitration clauses only after exhausting the option of conciliation as an Alternative Dispute Resolution Mechanism. For the purpose of this clause, the option of conciliation shall be deemed to have been exhausted, even in case of rejection of conciliation by any of the parties.

42.2 Arbitration (Applicable for Suppliers/Contractors other than PSU and MSME):

1. Except as otherwise provided elsewhere in the contract, if any dispute, difference, question or disagreement arises between the parties hereto or their respective representatives or assignees, in connection with construction, meaning, operation, effect, interpretation of the contract or breach thereof which parties are unable to settle mutually through Conciliation/Mediation, the same shall be referred to Arbitration.

2. A party wishing to commence arbitration proceeding shall invoke an Arbitration Clause by giving 30 days' notice to the other party. The notice invoking arbitration shall specify all the points of dispute with details of the amount claimed to be referred to arbitration at the time of invocation of arbitration and not thereafter. If the claim is in foreign currency, the claimant shall indicate its value in Indian Rupee for the purpose of constitution of the arbitral tribunal.

3. The number of arbitrators and the appointing authority will be as under:
Claim amount (excluding claim for interest and counter claim, if any)

Claim amount. {excluding claim for interest and counter claim, if any)	**Number of Arbitrator**	**Appointing Authority**
Up to Rs. 25.00 Lakh	Not applicable	Not applicable

Above Rs. 25.00 Lakh Up to Rs. 5 Crore	Sole Arbitrator from the panel of Arbitrators' List maintained by OIL	Mutually to be decided by the Parties.

The Parties agree that dispute involving claims below Rs. 25 lakhs and above Rs. 5 crores shall not be subject matter of Arbitration but subject to the exclusive jurisdiction of the Court(s) situated at New Delhi.

4. The parties agree that they shall appoint only those persons as arbitrators who accept the conditions of the arbitration clause. No person shall be appointed as Arbitrator or Presiding Arbitrator who does not accept the conditions of the arbitration clause.

5. If any of the Arbitrators so appointed dies, resigns, becomes incapacitated or withdraws for any reason from the proceedings, it shall be lawful for the concerned party/arbitrators to appoint another person in his place in the same manner as aforesaid. Such person shall proceed with the reference from the stage where his predecessor had left if both parties consent for the same; otherwise, he shall proceed de novo.

6. Parties agree and undertake that neither shall be entitled for any pre-reference or pendente-lite interest on its claims. Parties agree that any claim for such interest made by any party shall be void. Parties agree that a claim for any such interest shall not be considered and shall be void. The Arbitrator or Tribunal shall have no right to award pre-reference or pendent-lite interest in the matter.

7. The arbitral tribunal shall complete the proceedings, make and publish the award within time stipulated in the Arbitration and Conciliation Act, 1996(as amended from time to time)

8. If after commencement of the arbitration proceedings, the parties agree to settle the dispute mutually or refer the dispute to conciliation, the arbitrators shall put the proceedings in abeyance until such period as requested by the parties. Where the proceedings are put in abeyance or terminated on account of mutual settlement of dispute by the parties, the fees payable to the arbitrators shall be determined as under:

a) 20% of the fees if the claimant has not submitted a statement of claim.
b) 40% of the fees if the pleadings are complete.
c) 60% of the fees if the hearing has commenced.
d) 80% of the fees if the hearing is concluded but the award is yet to be passed.

9. Each party shall be responsible to make arrangements for the travel and stay etc. of the arbitrator appointed by it. Claimant shall also be responsible for making arrangements for travel and stay of the

Presiding Arbitrator and the expenses incurred shall be shared equally by the parties. In the case of sole arbitrator, both parties shall equally share all expenditures that may be required to be incurred.

10. The fees and other administrative/secretarial expenses of the arbitrator(s) shall not exceed the model fee as stipulated in the Schedule of the Act and such expenses shall be equally borne by the parties.

11. The seat and venue of the arbitration proceeding shall be New Delhi.

42.3 Arbitration (applicable in case of Contract awarded on Public Sector Enterprise):

1. If the Parties fail to resolve such a dispute or differences by Mutual Consultation/Good Faith Discussions, such disputes or difference shall be taken up by either party for resolution through Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD) as mentioned in DPE Office Memorandum No. 05/0003/2019-FTS-10937 dated 14.12.2022 issued by Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises, Government of India and its further clarifications, modifications and amendments, issued from time to time.
2. A party wishing to commence arbitration proceedings shall invoke Arbitration Clause and refer the dispute(s) to AMRCD with a copy to the other party. The notice invoking arbitration shall specify all the points of dispute with details of the amount claimed to be referred to arbitration at the time of invocation of arbitration and not thereafter.
3. Upon such reference, the dispute shall be decided by the Competent Authority appointed under the AMRCD, whose decision shall bind the parties finally and conclusively. The parties in the dispute will share equally the cost of the arbitration as intimated by the Arbitrator.

42.4 Arbitration (Applicable to Micro, Small and Medium Enterprise)

In the event of any dispute or difference relating to, arising from, or connected with the Contract, efforts shall be made to resolve the dispute(s) amicably by mutual consultation and in case such dispute(s) cannot be resolved through mutual consultation, then same shall be resolved through the procedure as prescribed in Section-18 of the Micro, Small and Medium Enterprises Development Act, 2006.

42.5 Exclusions

Parties agree that following matters shall not be referred to conciliation or arbitration:

a) Any claim, difference or dispute relating to, connected with or arising out of OIL's decision to initiate any proceedings for suspension or debarment or banning, or decision to suspend or to ban or to debar business dealings with the bidder/CONTRACTOR and/or with any

other person involved or connected or dealing with bid/contract/bidder/CONTRACTOR.

b) Any claim, difference or dispute relating to, connected with or arising out of OIL's decision under the provisions of Integrity Pact executed between OIL and the Bidder/CONTRACTOR.

c) Any claim, difference or dispute relating to, connected with or arising out of OIL's decision to comply with any order or directive of any statutory or government authority.

43.0 COMPLETION OF CONTRACT:

Unless otherwise terminated under the provisions of any other relevant Clause or extended through written communication, this Contract shall be deemed to have been completed at the expiry of the Period specified in the contract or period of defect liability, as provided for under the Contract, whichever is later.

44.0 TERMINATION:

44.1 Termination on expiry of the contract: This Agreement shall be deemed to have been automatically terminated on the expiry of the contract period unless OIL has exercised its option to extend this contract in accordance with the provisions, if any, of this contract.

44.2 Termination of contract for death: If the CONTRACTOR is an individual or a proprietary concern and the individual or the proprietor dies or if the CONTRACTOR is a partnership concern and one of the partners dies then unless, the COMPANY is satisfied that the legal heir of the individual or the proprietary concern or the surviving partners are capable of carrying out and completing Contract, the COMPANY is entitled to cancel the Contract for the uncompleted part without being in any way liable for any compensation payment to the estate of the deceased CONTRACTOR and/or to the surviving partners of the CONTRACTOR's firm on account of the cancellation of Contract. The decision of the COMPANY in such assessment shall be final & binding on the parties. In the event of such cancellation, the COMPANY shall not hold the estate of the deceased CONTRACTOR and/or the surviving partners of CONTRACTOR's firm liable for any damages for non- completion of the Contract.

44.3 Termination on account of Force Majeure: Unless the contract provides otherwise, either party shall have the right to terminate this Contract on account of Force Majeure as set forth in Article-31.0 above.

44.4 Termination on account of insolvency: In the event that the CONTRACTOR or its collaborator or its guarantor at any time during the term of the Contract, becomes insolvent or makes a voluntary assignment of its assets for the benefit of creditors or is adjudged bankrupt or under the process of insolvency or liquidation, then the COMPANY shall, by a notice in writing have the right to terminate the Contract and all the CONTRACTOR's rights and privileges hereunder, shall stand terminated forthwith.

However, COMPANY shall be at liberty to give the Receiver or Liquidator or Insolvency Professional Manager, as appointed by the Competent Court/Tribunal, the option of carrying out the Contract subject to its technical & financial competence and his providing a guarantee for due and faithful performance of the Contract.

44.5 **Termination for Unsatisfactory Performance**: If the COMPANY considers that, the performance of the CONTRACTOR is unsatisfactory, or not as per the provision of the Contract, the COMPANY shall notify the CONTRACTOR in writing and specify in details the cause of dissatisfaction. The COMPANY shall have the option to terminate the Contract by giving 15 days notice in writing to the CONTRACTOR, if CONTRACTOR fails to comply with the requisitions contained in the said written notice issued by the COMPANY. In the event CONTRACTOR rectifies its non- performance to the satisfaction of the COMPANY, the option of termination may not be exercised by the COMPANY. If, however, CONTRACTOR repeats non-performance subsequently, COMPANY shall exercise the option to terminate contract by giving 07 day's notice. Such CONTRACTOR shall be put on holiday as per the Banning Policy of OIL [available at www.oil-india.in].

44.6 **Termination due to change of ownership and Assignment:** In case the CONTRACTOR's rights and/or obligations under this Contract and/or the CONTRACTOR's rights, title and interest to the equipment/ material, are transferred or assigned without the COMPANY's written consent, the COMPANY may at its option, terminate this Contract. COMPANY shall not be however under any obligation to accord consent to the CONTRACTOR for change of ownership & assignment of the contract.

44.7 If at any time during the term of this Contract, breakdown of CONTRACTOR's equipment results in CONTRACTORs being unable to perform their obligations hereunder for a period of 15 successive days, COMPANY at its option, may terminate this Contract in its entirely or partially to the extent non-performance, without any further right or obligation on the part of the COMPANY, except for the payment of money then due. No notice shall be served by the COMPANY under the condition stated above.

44.8 **Termination for delay in mobilization:** CONTRACTOR is required to mobilize complete equipment alongwith crew for commencement of services at the specified site within the maximum allowed number of days from the date of LOA/Notice for Mobilization as specified in the special conditions of contract. If the CONTRACTOR (successful bidder) fails to complete the mobilization as above, OIL shall have, without prejudice to any other clause of the CONTRACT, the right to terminate the contract.

44.9 Notwithstanding any provisions herein to the contrary, the Contract may be terminated at any time by the COMPANY on giving 30 (thirty) days written notice to the CONTRACTOR due to any other reason not covered under the above Article from **44.1 to 44.8** and in the event of such termination the COMPANY shall not be liable to pay any cost or damage to the CONTRACTOR except for payment of services as per the

Contract upto the date of termination.

44.10 Consequence of Termination: In all cases of termination herein set forth, the relative obligations of the parties to the Contract shall be limited to the period up to the date of termination. Notwithstanding the termination of this Contract, the parties shall continue to be bound by the provisions of this Contract that reasonably require some action or forbearance after such termination.

Upon termination of this Contract, CONTRACTOR shall return to COMPANY all of COMPANY's properties, which are at the time in CONTRACTOR's possession.

In the event of termination of contract, COMPANY will issue Notice of termination of the contract with date or event after which the contract will be terminated. The contract shall then stand terminated and the CONTRACTOR shall demobilize their personnel & materials.

Demobilization charges shall not be payable by COMPANY in case of Article from 44.4 to 44.7

45.0 TO DETERMINE THE CONTRACT:

In such an event (i.e. termination under Article No. 44.4 to 44.9 above), the contract shall stand terminated and shall cease to be in force from the date of such notification by the COMPANY. Thereafter the CONTRACTOR shall stop forthwith any of the work then in progress, except those work which the COMPANY may, in writing, require to be done to safeguard any property or work, or installations from damages, and the COMPANY may take over the remaining unfinished work of the CONTRACTOR and complete the same through a fresh CONTRACTOR or by other means, at the risk and cost of the CONTRACTOR, and any of its sureties if any, shall be liable to the COMPANY for any excess cost occasioned by such work having to be so taken over and completed by the COMPANY over and above the cost at the rate/cost specified in the schedule of quantities and rates/prices.

46.0 WITHOUT DETERMINING THE CONTRACT: In such an event (i.e. termination under Article No. 44.4 to 44.9 above), the COMPANY may take over the work of the CONTRACTOR or any part thereof and complete the same through a fresh CONTRACTOR or by other means, at the risk and cost of the CONTRACTOR. The CONTRACTOR and any of its sureties are liable to the COMPANY for any excess cost over and above the cost at the rates specified in the schedule of quantities and rates/prices, occasioned by such work having been taken over and completed by the COMPANY.

47.0 ERRING/DEFAULTING AGENCIES:

Erring and defaulting agencies like bidder, CONTRACTOR, supplier, vendor, service provider will be dealt as per OIL's existing Banning Policy dated 17th March, 2023 available in OIL's website: www.oil-india.com. Moreover, OIL reserves the right to take legal or any other action on

the basis of merit of the case.

48.0 MISCELLANEOUS PROVISIONS:

CONTRACTOR shall give notices and pay all fees at their own cost required to be given or paid by any National or State Statute, Ordinance, or other Law or any regulation, or bye-law of any local or other duly constituted authority as may be in force from time to time in India, in relation to the performance of the services and by the rules & regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the services.

CONTRACTOR shall conform in all respects with the provisions of any Statute, Ordinance of Law as aforesaid and the regulations or bye-law of any local or other duly constituted authority which may be applicable to the services and with such rules and regulation, public bodies and Companies as aforesaid and shall keep COMPANY indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, regulation or bye-law.

During the tenure of the Contract, CONTRACTOR shall keep the site where the services are being performed reasonably free from all unnecessary obstruction and shall store or dispose of any equipment and surplus materials and clear away and remove from the site any wreckage, rubbish or temporary works no longer required. On the completion of the services, CONTRACTOR shall clear away and remove from the site any surplus materials; rubbish or temporary works of every kind and leave the whole of the site clean and in workmanlike condition to the satisfaction of the COMPANY.

Key personnel cannot be changed during the tenure of the Contract except due to sickness/death/resignation of the personnel or any other justified situation in which case the replaced person should have equal experience and qualification, which will be again subject to prior approval, by the COMPANY.

End of GCC

SECTION-II
SCOPE OF WORK

SPECIFICATION No-A0
LEAD SPECIFICATION

Project Titte: Hiring service for Construction of Grid Power Receiving-end Infrastructure at Moran Power Station premises to step down from 33 kV (grid voltage) to 11 kV Voltage level and integration into OIL's electrical network on LSTK-EPC basis.

1.0 Introduction:

Oil India Limited is a Maharana Company under the Ministry of Petroleum & Natural Gas engaged in the Exploration Production activity of crude oil and natural gas. The Company has significant presence in the upper Assam area, especially in Moran. The company has critical operation installations in the OIL, Moran. Moran has very connectivity by air, road or railways. Details of the nearest locations are as follows:

i. Near National Highway (NH-37): 2.5 KMs from OIL, Moran township.
ii. Nearest Railway Station: 10 KMs from OIL, Moran
iii. Nearest Airport: (Mohanbari Airport): 60 kms from OIL, Moran

OIL, Moran is dependent on it's own captive power plant to meet the electrical energy requirement since inception. The plant presently consists of two (02) nos of Gas Turbine Generator (GTG) and one (01) no of gas engine generator (GEG). The GTG units were commissioned in the year 1998 and has served for more than 25 years. Accordingly, GTG units along with existing switchgear need to be replaced with alternative solutions. As an alternative solution, OIL intend to draw grid power to fulfil its electrical energy requirement at OIL, Moran. To do so, a 33/11 kV substation along with its accessories is required to be established inside the premises of Moran Power Station. The substation will receive power from nearby 132 kV Moran Grid Sub-Station of Assam Electricity Grid Corporation Limited (AEGCL) at 33 kV voltage level and step down the voltage to 11 kV for integration with OIL's existing distribution network.

To develop the necessary infrastructure, OIL intends to "*Hire Services for Construction of Grid Power Receiving-end Infrastructure at Moran Power Station premises to step down from 33 kV (grid Voltage) to 11 kV Voltage level and integration into OIL's electrical network on LSTK basis.*"

2.0 Site Condition:

Critical important parameter of the site is as follows:

i. Elevation: 92 m
ii. Maximum Ambient Temperature: 36° C
iii. Minimum Ambient Temperature: 10° C
iv. Relative Humidity: 90 %
v. Average Rainfall: 200 mm annually
vi. Thunder storm: 70 days/annually
vii. Wind Speed: 3-10 km/h
viii. Seismic Zone: VI

All equipment, materials shall be selected or designed considering the site condition

only.

3.0 System Description: The Moran Power Station comprises two (02) nos. of Gas Turbine Generator (GTG) and one (01) nos. of Gas Engine Generator (GEG) each with a capacity of 3 MW. The GTG & GEG are generating power at 11 kV Voltage level and directly connected to individual 11 kV switchboards of GTG and GEG. Both the units 2X3 MW GTGs and 1X3 MW GEG are installed inside the premise of Moran Power Station in two (02) separate buildings with a separation of approximately 15 meters. Critical load centers of Moran are being fed from these two (02) switchgear panels i.e. GTG 11 KV Switch Board and GEG 11KV Switch Board only. Details of the feeders connected to these switchboards are as follows:

Table-1: Feeder Details	
GTG 11 kV Switch Board	GEG 11 kV Switch Board
Station transformer-1	Pump-station FDR-1
Station Transformer-2	Pump station FDR-2
Feeder- 1R	Feeder- 1L
Feeder- 2R	Feeder- 2R
Interconnector-1	Interconnector-1
Interconnector-2	Interconnector-2

Out of the three (03) units of Generators, only one unit runs at a time to meet the electrical energy demand of OIL, Moran. A synchronization scheme is already in operation which allows smooth load transfer among the units without any power interruption. The two (02) interconnectors enable the power flow between these two 11 KV switchboards regardless of whichever unit is running.

The generator neutral of all three (03) units is being earthed using Neutral Grounding Resistor (NGR) to limit the earth's fault current to 192 A. However, during load transfer between the units, only one (NGR) remains active.
The auxiliaries power requirement of both GTG & GEG is met using individual LT switchgears panels.

4.0 Project Requirement:

A. The project envisages to replace the 2X3 MW GTG units along with the auxiliaries by grid connectivity by setting up a 33/11 kV substation to enable power from nearby 132 kV Moran Grid Substation Station.

B. The 33/11 KV substation design shall strictly adhere to the guidelines of the Central Electricity Authorities and applicable Grid code.

C. Project shall be designed to achieve the following objectives

1. Grid Power to serve as main source
2. GEG continues to serve as backup power source
3. Synchronization facility shall be available between GEG & grid power at 11 kV and flexibility to switch power source as per operational requirement.
4. The 33/11 kV substation equipment shall be housed inside an E-house and shall be ready for direct installation at site i.e. Moran Power Station

premises. Proposed layout diagram is attached as **A21.1**. This is for indication purpose only, bidder can change during detailed engineering.

5. The earth fault current in OIL's 11 kV network shall be limited to 192 A through the installation of a Neutral Grounding Resistor (NGR) connected to the star point of the power transformers. The contractor shall design the interlocking scheme such that, under all normal operating conditions, only one of the NGR connected to the power sources including Power Transformers, shall remain in circuit thereby limiting the earth's fault current to 192 A.

D. The project shall include a facility to control and monitor all system data of the new substation in real-time as well as keep storage for a specific period.

E. The project shall also include the facility to carry out energy management and critical asset condition monitoring of the equipment of the substation.

F. The Project shall also include rooftop solar panels to harness solar energy.

G. The project also requires carrying out civil jobs like site preparation, construction foundations for E-house substation, and its outdoor equipment.

A tentative single line diagram of Moran Power Station after completion of the project is provided as Attachment no **A0.1.** This is for indication purpose only and bidder may change as per their design requirement.

5.0 Technical Specifications of the project: The specification of the project component are prepared considering the CEA guidelines, Indian Electricity Grid Code, MNRE guidelines, Assam Electricity Regulator Commission's guidelines and the load sanction approval from the Department of Power, Govt of Assam. Please refer to the attachments as mentioned below for detailed technical specifications of various components of the project:

a. Switch Board - 33 KV as per **Specification No. A01**: Indoor 33KV, 6 panel including bus riser (as applicable), Air Insulated Switchboard in a E-House

b. Switchboard-11 KV as per **Specification No. A02:** Indoor 11KV, 19 panel including bus riser (as applicable), Air Insulated Switchboard in a E-House

c. Power Transformer as per the **Specification No A03 & A03.1**:
   i) 5 MVA, 33/11 KV, Oil type Power Transformer – 2nos
   ii) Nitrogen injected Fire Suppression System for the 5 MVA transformers.

d. Dry type Station Auxiliary Transformer as per the **Specification No. A04**: 500 KVA, dry type 11KV /433 Volt, 3 Phase, 50 Hz Transformer – 2nos

e. LT system as per **Specification No. A05**: One set 415 Volt switchgear complete with circuit breakers and associated equipment.

f. Synchronization of Grid power with Gas Engine Generator as per **Specification No. A06:** Synchronization panel for connecting Grid Power at 11 KV Voltage with existing Gas Engine Generator.

g. Substation Automation System (SAS) as per **Specification No. A07**: Integration of Relays (IEDs) in 33 KV and 11 KV switchboard for real time monitoring, protection and control through open architecture IEC 61850.

h. Energy Management System (EMS) as per **Specification No. A08**: Integration of Energy Meters in 33KV, 11KV and 415 V level for monitoring and archiving power flow including Voltage, Current, Harmonics etc.

i. Asset Monitoring System (AMS) as per **Specification No. A09**: AMS will be IEC 61850 compliant and applicable to Power Transformer, Station Transformer, 33 KV & 11 KV Switchboards.

j. Cyber Security as per **Specification No. A10**: Cyber security provision for EMS, SAS and Asset Monitoring System.

k. Automatic Power Factor Correction (APFC) Panel as per **Specification No. A11**: To maintain optimal power factor close to 0.98-0.99.

l. Uninterrupted Power Supply (UPS) System and Battery System as per **Specification No. A12.1 & A12.2**: UPS Battery for control and protection system

m. One set of 33KV and 11 KV Grade Cable (HT) and one set of LT cable as per **Specification No. A13.1 and A13.2.**

n. Relays as per **Specification No. A14**: IEC 61850 compliant relays for 33 KV and 11 KV switchboards.

o. Tri-Vector Meter as per **Specification No. A15:** To accurately measure Active, Reactive and Apparent Power for facilitating precise billing.

p. Roof top Solar Plant as per **Specification No. A16:** Roof Top Solar Plant at E-House.

q. Fire Detection and Protection System in E House is provided as **Specification No. A17**.

r. Illumination System as per **Specification No. A18:**

1) Illumination inside E-House, area illumination at Transformer Yard and nearby Road.
2) Existing High mast to light be dismantled if obstructing project site as per design & same to be installed in a new location for illumination of the project site.

s. Requirements of Air Conditioner for E-House is provided as **Specification No.**

A19.

t. Close Circuit Camera as per **Specification No. A20**: Video surveillance to monitor E House Electrical equipment and secure E house outside Area.

u. E house as per **Specification No. A21**: 33/11 KV Substation equipment will be housed in a prefabricated modular enclosure (E House).

v. 33 kV isolator as per **Specification No. A22.**

w. Lightning Arrestor and Surge Counter at Incoming grid source as per **Specification No. A23**

x. Earthing System as per **Specification No. 24.**

y. Site Civil works as per **Specification No. 25**.

z. Requirements of mandatory Spare are provided in **Specification No. A26**.

Any equipment/item/job/activity not covered under the above attachment, but essential for the completion of the project, shall have to be designed, manufactured, procured, tested, installed and commissioned by the bidder as per the latest version of Indian Standards or the guidelines of the central or state regulatory authorities.

6.0 Statutory Requirements: All necessary approval from the statutory body will be under the scope of OIL. However, all necessary documents and information must be made available by the bidder/vendor in a timely manner.

7.0 Area for the project: The project site will be inside Moran Power Station premises. The tentative area of approximately 40-meter X 25 meters has been earmarked for development of the Substation (E-House). Additional space of approximately 35-meter X 15 meter is earmarked for outdoor units. Bidder/vendor is requested to develop a design with the objective of optimal use of land. Bidder may visit site during tender phase prior to bid closing date to assess the location.

8.0 Site Development/Area preparation: Project Site will be handed over to the bidder in a obstruction free condition. However, necessary further activities like leveling and earth filling as required shall be under the scope of bidder.

9.0 Supply of Water, Electricity and Illumination during site activities: Contractor shall arrange by their own the required electricity, area illumination arrangement & supply of water for all construction activities.
In case of Bidder requested OIL for supply of electricity for site activities, OIL may provide electricity and the same will be charged from the bidder at the generation cost of electricity at Moran Power Station and amount will be adjusted in bills. In such situation, OIL will supply a single point of power at 415 Volts and iInternal power distribution for projects will be under the scope of bidder to maintain the highest standard of safety including but not limited to earth leakage device, overload and overcurrent device. If opted, electricity for site activity will be supplied by OIL using an energy meter only and the necessary arrangement for connection to be in the

scope of the contractor.

10.0 Project Manager and Site In-charge:

Contractor shall depute a technically and administratively competent person having experience of executing similar nature of projects as Project Manager for coordination and overall management of project activities, including design, procurement,
manufacturing, transportation, installation & commissioning and final handover.
During execution of site activities, the contractor shall deploy a Site In-Charge responsible for ensuring progress as per approved design and schedule, maintaining site safety and site coordination with OIL.

11.0 Site Job: The bidder is expected to carry out the following activities during the project execution. However, any activity critical for the completion of the project shall be under the scope of the bidder as well:

(i) Mobilize the required manpower, materials, and other resources to the site.

(ii) Arrange suitable facilities at site for the safe and secure storage of materials and spares.

(iii) Execute all project-related activities under the continuous supervision of the Project Manager and Site In charge

(iv) Arrange a temporary office or suitable facility near the site for continuous monitoring of work, conducting meetings, preparation of reports, and other project-related activities.

(v) Liaise and coordinate project activities with the operations of Moran Power Station to ensure safety and minimize power interruptions.

(vi) Carry out the following activities:

a. Preparation of the site as per the approved civil drawings for construction of the foundation of the E-House. Necessary precautions shall be taken in advance to mitigate issues arising due to incessant rains during the monsoon period including availability of engine driven dewatering pumps of required capacity and quantity.

b. Construction of the foundation of the E-House to the highest standard of quality and keeping it ready for installation of the E-House.

(vii) Transportation and safe unloading of the E-House and all associated accessories at the site.

(viii) Installation of the E-House on the completed civil foundation.

(ix) Assembling and System integration of the E-Houses at site.

(x) Connection and testing of electrical circuits, control circuits, and communication circuits.

(xi) Shifting feeders from the existing 11 kV panels of GTG and GEG to the new 11 kV panels of the E-House.

(xii) Cable laying and termination of 33 kV, 11 kV, and all control cables under the

scope of this project.

(xiii) Carry out the site test as mentioned in the attached technical specification of the substation component. In addition, the following minimum site acceptance tests (but not limited to) are to be carried out as well

a) High Pot Test and Insulation testing of 33 kV and 11 kV cables
b) Primary injection testing
c) Functional testing of panels
d) Testing of safety interlocks
e) Testing and commissioning of the Substation Automation System (SAS)
f) Testing and commissioning of 33 KV Switch gear Panels
G) Testing and commissioning of 11KV Switchgear Panels
H) Testing and commissioning of Power Transformers
I) Testing and commissioning of Station auxiliary Transformers
J) Testing and commissioning of UPS, Battery Charger and Battery Bank.
K) Testing and commissioning of the Energy Management System (EMS)
l) Testing and commissioning of the Critical Asset Monitoring System
m) Testing and commissioning of rooftop solar panels
n) Testing and commissioning of Fire Detection System
o) Measurement of earth resistance
p) Testing and commissioning of APFC Panel

(xiv) Implementation of the new control scheme developed for synchronization of GEG and grid power. The modifications required to achieve synchronization shall be carried out by the contractor at site in consultation with the OEM of GEG.

12.0 Safety Precaution at Site: Bidder shall abide by the Safety Management system of OIL. Please refer to Specification No. A30 for general guidelines of OIL's safety policy. In addition, Bidder/vendor is advised to ensure the following:

A) Ensure barricading to restrict the entry of un-authorized personnel in project site

B) Precaution shall be taken to minimize the dust formation as the ventilation duct for Gas Engine Generator takes suction near the project area only.

C) Maintain an attendance register to keep daily attendance of its manpower

D) Maintain a register to record the entry of visitors/work person

E) Participate in safety fire mock drill carried out in Moran power station from Time to Time

F) Installation of temporary CCTV at the project site for continuous monitoring of site activity.

13.0 Project Schedule and project status reporting:

A) The Contractor is required to prepare a Gantt Chart /Work Plan Chart encompassing the various stages of the project like engineering, procurement, testing, installation and commissioning. Bidder is required to submit the chart within 30 days from the issue of LOA by OIL.

Gantt Chart / Work Plan Chart: A master network schedule conforming to the overall schedule shall be prepared by the contractor. The master Network will identify milestones of key events in the areas of engineering, procurement,

manufacture, transportation, erection and commissioning.

B) The bidder shall regularly update the chart and submit monthly progress reports to OIL. The updates and reports must reflect actual progress, the percentage of completion of each activity, any schedule of changes and anticipated completion time.

C) The bidder shall provide full access to all information to the officials of OIL at a regular interval or at a request.

D) Apart from the above, a monthly meeting shall be conducted with the officials of OIL to review the progress.

14.0 Packing, Transportation and Insurance:

Packing of all equipment/item/ product, transporting the same, receiving at site, unloading and proper storage shall be under the scope of bidder. Safety and security of all equipment till project handover shall be Contractor's responsibility. All material/equipment shall be insured by the contractor till handing over the project to OIL.

It will be the responsibility of the bidder/vendor to carry out the route survey for successfully transporting the finished product from OEM's workshop to system Integrator's workshop and finally to the project site. The bidder/vendor is advised to arrange for necessary transportation and logistical support for unloading the package at site i.e. Moran Power Station premises.
Bidder has to arrange for necessary road transport permission from appropriate authority, if required.

15.0 Pre-bid conference:

Bidders are requested to attend a Pre-bid conference for clarification on the Tenders' technical specifications and commercial conditions, on the time, date, and place mentioned therein. Participation in such a Pre-bid conference is not mandatory. If a bidder does not participate or does not submit any query, then no subsequent representations from them regarding the Technical/ commercial specifications/ conditions shall be entertained.

A) Bidders should depute their authorized representative in the Pre-Bid conference.

B) To submit queries prior to pre-bid conference. The maximum number of persons that would be permitted per bidder for participation in pre-bid meeting shall be limited to two (2) persons.

C) Non-attendance of the pre-bid conference shall not be a cause for disqualification of the bidder.

D) Any modification to the Bidding Documents, which may become necessary because of the pre-bid conference, if agreed by OIL, shall be made by OIL through the issuance of an amendment to tender only.

E) All costs for attending the Pre-Bid conference shall be borne by the prospective bidder(s).

16.0 Site Storage: Bidder/Vendor shall arrange for facility to store project related items. Space will be made available at Moran Power Station premises. The security of the store shall be the responsibility of the bidder.

17.0 Commissioning of Equipment, Plant Commissioning and Handing Over:

A) Commissioning of Equipment:

Successful commissioning of each equipment in accordance with the approved Quality Control (QC) Protocol/ Site Commissioning Test records, shall constitute Commissioning of the respective equipment. Completion of all tests, pre-commissioning checks and documentation as stipulated in the applicable QC Protocol for the equipment shall form an integral part of commissioning.

B) Plant Commissioning and Handover and Documentation:

i) Plant Commissioning: Charging of equipment (as per requirement) and demonstration of successful operation of the Sub-Station for 48 (forty-eight) continuous hours without any interruption or abnormality will constitute Plant Commissioning. However, interruption due to external events/faults originated from external system (State Grid & OIL's network) shall be excluded from the calculation of operation hours.

ii) Handover and Documentation: Submission of Document including as build, mandatory spare as per contract requirement shall constitute Project Completion. Thereafter, completion shall be recorded through jointly signed Handover Minutes between Company (OIL) and Contractor.

18.0 The EPC contractor shall be fully responsible for end-to-end design, engineering, procurement, construction, integration, testing, and commissioning of the complete substation system on a LSTK basis, ensuring seamless integration with existing Moran Power Station infrastructure. The design shall be future-ready, scalable, cyber-secure, compliant with all applicable Indian standards, grid codes and statutory requirements.

19.0 Payment Terms:

Payment under the Contract shall be made on milestone basis linked to the progress of work and submission of supporting documents duly certified by OIL. The detailed milestone-base payment schedule is attached as Specification No. A31.

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TECHNICAL SPECIFICATION NO - A01
33 KV SWITCHBOARD

1.0 SCOPE OF WORK:

This Specification covers the design and engineering, manufacture, testing at the manufacturer's factory, painting, packing for transport, insuring, transportation by road and delivery & unloading of 33 KV air insulated Indoor type, Metal Clad, Self Supported, Single copper Busbar arrangement, horizontal draw out type Vacuum Circuit Breaker (VCB) having SCADA compatibility suitable for solidly earthed neutral along with all accessories as specified in this tender at OIL's site i.e. Moran Power Station.

2.0 UNIT OF MEASUREMENT AND LANGUAGE:

In all correspondence, in all technical schedules and on all drawings prepared by the manufacturer, the metric units of measurement shall be used. On drawings or printed pamphlets where other units have been used, the equivalent metric measurements shall be added. All documents, correspondence, drawings, reports, operating and maintenance instructions/manuals and nameplate details of the equipment shall be in English language.

3.0 SYSTEM PARAMETERS:

a) Type: Air insulated Switchgear Indoor Type
b) System voltage: 33 KV
c) Highest system voltage: 36 KV
d) Number of phase: Three
e) Power frequency: 50 Hz.
f) System earthing: Solid earth.
g) Rated short time withstand current: 25 KA
h) Rated insulation voltage: 36 kV
i) Rated power frequency withstand voltage kV (1min): 70 kV
j) Rated lightning impulse withstand voltage(kV): 170
k) Internal arc withstand current(1s): Minimum 25 kA
l) Busbar current rating: Minimum 1250 A
m) Busbar Material: Coper (rectangular Shape)

4.0 PANEL CONFIGURATION:

The panel shall comprise of five (05) cubicles with the following configuration:

a) Incomers= Two (02) Nos
b) Bus Coupler = One (01) Nos
c) Outgoing/Transformer Feeder= Two (02) Nos

Refer attachment A0.1.

5.0 GENERAL REQUIREMENTS:

a) The design, dimensions and materials of all parts shall be such that they will not suffer damage under the most adverse conditions nor result in deflections and vibrations, which might adversely affect the operation of the equipment. Mechanisms shall be constructed to avoid sticking due to rust or corrosion.

b) The equipment and apparatus shall be designed and manufactured in the best and most substantial and workmanlike manner with materials best suited to their respective purpose and generally in accordance with up-to-date recognized standards of good practice.

c) Whenever possible, all similar parts, including spare parts, shall be made interchangeable. Such parts shall be of the same materials and workmanship and shall be constructed to such tolerances as to enable substitution or replacement by spare parts easily and quickly.

d) All equipment shall be designed to minimise the risk of fire and consequential damage, to prevent ingress of vermin and dust and accidental contact with electrically energized or moving parts. The switchgear panels shall be capable of continuous operation with minimum attention and maintenance in the exceptionally severe conditions likely to be obtained in a tropical climate and where the switchgear is called upon to frequently interrupt fault currents on the system and also where the duty of operation is high.

e) Suitable lifting hooks need to be provided for lifting of the equipment.

f) All steel castings and welding shall be stress-relieved by heat treatment before machining, and castings shall be stress-relieved again after repairing welding.

g) Liberal factors of safety shall be used throughout, especially in the design of all parts subject to alternating stresses or shocks.

6.0 GUIDELINE FOR AC & DC AUXILIARY POWER SUPPLY:

Low voltage equipment and installation shall be designed in accordance with EMC (Electromagnetic Compatibility, IEC 61000) directives. The rating and design criteria for low voltage equipment shall be as follows:

A) AC Supply Rating system:

i. Rated 3-phase voltage: 433 V AC

ii. Connection type 3ph 4wire

iii. Rated phase voltage: 250 V AC

iv. Grounding system: Solid Earthing

v. Frequency 50 HZ

vi. Voltage variation ± 10 %

vii. Frequency variation ± 5 %

viii. Power frequency 1 min, Test Voltage 3 kV

ix. Thermal rating of conductors 120 % of load

The AC supply shall be used for power circuits and for lighting, indication, motor controls etc. Unless otherwise specified, the equipment provided under this tender is to be capable of reliable operation at voltages as low as 85% of the rated voltage, and to withstand continuously up to 110% supply voltage above the rated value of 250VAC.

B) DC Auxiliary Supply Rating:

DC auxiliary supply at 110 VDC shall be designed by system integrator to ensure back up time to be min. 3 hrs.

The auxiliary dc supply shall be used for controls, indication, alarm, circuit breaker tripping and closing circuit, emergency lighting etc. All equipment and apparatus including the circuit breakers, control devices and accessories, measuring and indicating instruments and electronic equipment shall be capable of satisfactory operation at 80% to 130% of the rated dc supply voltage. However, in case of VCB, for tripping the range should be 70% to 110% and for closing that should be 85% to 110%.

7.0 ELECTRICAL CONTROLS, AUXILIARIES AND POWER SUPPLIES:

a) Responsibility for electrical control and auxiliary.

The manufacturer shall provide all control, indication, alarm and all auxiliary equipment with wiring and interconnecting cable which are integral parts of or are directly associated with or mounted on the switchgear panels to be supplied under this tender. The design of protection and control schemes for the switchgear panels shall be subject to approval of OIL.

b) Operation and control.

Interlocking devices shall be incorporated in the control circuit to ensure safety, and proper sequence and correct operation of the equipment. The scheme will be finalized during detailed engineering and drawing approval.

c) Corona and radio interference

I. Switchgear shall electrically be designed to avoid local corona formation and discharge likely to cause radio interference.

II. The design of jointing of adjacent metal parts and surfaces shall be such as to prevent corrosion of the contact surfaces and to maintain good electrical contact under service conditions.

III. Care shall be taken during manufacture of bus bar and fittings and during subsequent handling to ensure smooth surface free from abrasion. All joints on

the bus bar and the circuit within the switchgear board shall be silver or tin-plated to ensure good electrical connection.

8.0 GENERAL REQUIREMENT FOR CONSTRUCTION:

(a) Tropicalization: All equipment must be designed for operations in the severe tropic climate conditions and fully comply with climatic aging tests as per IEC 60932-class 2. In choosing materials their finishes, due regard shall be given to the humid tropical conditions under which the switchgear will be called upon to work. The manufacturer shall submit details of his usual practice which have proven satisfactory for application to the parts of the Switchgear panels, which may be affected by tropical conditions.

(b) Metals: Iron and Steel are generally to be painted or galvanized as appropriate. Indoor parts may alternatively have chromium or copper-nickel plates or other approved protective finish. Small iron and steel parts (other than rustless steel) of all instruments and electrical equipment, the cores of electromagnets and the metal parts of relays and mechanisms shall be treated in an appropriate manner to prevent rusting.

(c) Screws, Nuts, Springs, etc.: The use of iron and steels shall be avoided in instruments and electrical relays wherever possible. Steel screws shall be zinc, cadmium or chromium plated or where plating is not possible owing to tolerance limitations, shall be of corrosion resisting steel. Instrument screws (except those forming part of a magnetic circuit) shall be of brass or bronze. Springs shall be of non-rusting material, e.g., phosphor-bronze or nickel silver, as far as possible.

(d) Rubbers: Neoprene and similar synthetic compounds, not subject to deterioration due to the climatic conditions, shall be used for gaskets, sealing rings, diaphragms, etc.

(e) The switchgear shall be of CRCA steel / corrosion proof aluminium-zinc construction with sheet not less than 3 mm thickness for load bearing section and not less than 2mm thickness for non-load bearing and shall totally dust and vermin proof. However, if vendor has standardized the thickness of enclosure other than above mentioned and it meets the performance requirements and the design has been established through type test, the same shall be accepted. The panels shall be rigid without using any external bracings. The switchboard panels should comply with relevant IS / IEC and revision thereof and shall be designed for easy operation maintenance and further extension.

(f) Each circuit shall have a separate vertical panel with distinct compartments. Bus bar, metering, circuit breaker chamber, cables and cable box chamber should have proper access for maintenance and proper interlocks should be provided. All instruments (Except the Relays) shall be non-draw out type and safe guard in every respect from damages and provided with mechanical indicator of connection and disconnection position. The switchgear shall be completed with all necessary wiring, fuses, auxiliary contacts, terminal boards etc.

(g) The switchgear boards shall have a single front, single tier, fully compartmentalized, metal enclosed construction, comprising of row of freestanding floor mounted panels. The adjacent panels shall be completely separated by steel sheets except in busbar compartments where insulated barriers shall be provided to segregate adjacent panels. The switchgear assembly shall be dust, moisture, rodent and vermin proof, with the truck in any position SERVICE, ISOLATED, TEST or removed, and all doors and covers closed. All doors, removable covers and glass windows shall be gasketed all round with synthetic rubber or neoprene gaskets.

(h) The arcing contacts and bus bar should be rated for minimum 25 KA faults for 3 seconds for 33 kV system. Bus bars shall be capable of connecting one switchgear panel to other through proper insulated arrangement. The panels shall be modular in design.

(i) All relays, meters, breaker control switches, selector switches and indicator lamps shall be flush mounted on the respective cubicles door or on the control cabinet build on the front of the cubicle. AC/DC auxiliary supply switches/isolation switches for the cubicle space heater, cubicle lamp, spring charging motor circuit shall be located inside metering compartment.

(j) The breakers should be drawn out in horizontal position at ground level [with horizontal isolation. When breaker is drawn out in horizontal position none of the live components inside the 33 KV switchgear panel should be accessible. The safety shutters shall be robust and shall automatically cover the live components when the breaker is drawn out. The switchgear shall have complete interlocking arrangements at the fully inserted and fully drawn out and test positions. Withdrawal of the breaker should not be possible in ON position, it should not be possible to close the circuit breaker in service unless the entire auxiliary and control circuit are connected.

(k) Circuit breaker shall be vacuum; draw out type housed in a separate cubicle of the switchboard and shall be enclosed from all sides. A sheet steel hinged lockable door shall be at the front. It shall be possible to withdraw the circuit breaker to 'Test' and "Isolated' position with the door closed. Door interlock shall be provided such that the door can only be opened after withdrawing the breaker to 'Isolated' position and the breaker cannot be racked into the 'Service' position unless the door is closed. A visual indication as to show when the breaker is in 'Service', 'Test' or 'Isolated' position shall be provided in front of the door.

(l) Switchgear construction shall have a bushing or other sealing arrangement between the circuit breaker compartment and the busbar / cable compartments, so that there is no air communication around the isolating contacts in the shutter area with the truck in service position.

(m) The breaker and the auxiliary compartments provided on the front side shall have strong hinged doors, busbar and cabling compartments provided on the rear side have bolted compartment covers with self-retaining bolts. Breaker compartment doors shall have locking facility and provision for using "Lock Out Tag Out(LOTO)".

(n) All the high voltage compartments must have pressure discharge flap for the exit of gas due to internal arc to insure operator safety. All the HV compartment design must be type tested at 25 kA for 1 second for IAC classification and duration as per IEC As per IEC 62271-200 clause A. 4.5 (AFLR).

(o) Two separate earthing terminals shall be provided in each panel and shall be connected to the earth bus within the panel. The earth bus shall be of copper and shall have adequate cross-sectional area.

(p) The relay compartments shall have degree of protection not less than IP:52 in accordance with IS:2147. All louvers if provided shall have very fine brass or GI mesh screen, IPH-2 degree of protection as per IS: 3427 to all live parts shall (whether isolated or removed from panel) even when the breaker compartment door is open. Tight fitting garments / gaskets are to be provided at all openings in relay compartment.

(q) The switchboard shall have the facility of extension on the both sides of Adapter panels and dummy panels required to meet the Busbar.

(r) Surface cleaning: Seven Tank process or sand blasting

(s) Painting: Powder coating with texture finish

9.0 BUSBAR & CONNECTION:

(a) Bus bars and all other electrical connection between various components shall be made of electrolytic copper of rectangular cross sections, as per the type tested and ratified design. The bus bars section should have ample capacity to carry the rated current of minimum 1250 Amps in panel current rating at an ambient temperature of 40 deg C, continuously wit hout excessive heating and for adequately meeting the thermal and dynamic stresses in the case of short circuit in the system up to full STC rating of 25 kA for 3 sec.

(b) All bus bars connections shall be firmly and rigidly mounted on suitable insulators to withstand short circuit stresses and vibrations. 'Self-supported busbar' design will be acceptable if the same is ratified by type tests for the specified rating and busbar support drawings approved during type tests shall be furnished with the offer.

(c) All fasteners (Nuts Bolts) used for bus bar connections shall be of non-magnetic stainless steel. Only belleville type washers shall be provided for each nut bolt. If the fasteners used are not of stainless steel the bidder shall state in their offer the material used and confirm that the same is non-magnetic and is superior to stainless steel.

(d) Adequate clearance between live point and earth and between phase shall be provided to ensure safety as per provision in Indian Electricity Rule 2003 and its amendment thereof and also in accordance with the relevant Indian standard

specification and the same shall be capable of withstanding the specified high voltage tests as per IEC 62271-200 / IS 13118 and amendment thereof.

(e) Sharp edges and bends either in the bus bars or bus bar connections shall be avoided as far as possible. Wherever such bends or edges are un-avoidable, suitable compound or any other insulation shall be supplied to prevent local ionization and consequent flashover.

(f) The bus bars along with their supporting insulators etc. shall have a short time current rating of 25 KA for 3 sec. Test certificate of bus bar for rated STC rating shall be submitted, along with the bid. This shall be confirmed by the tenderers in their technical offer. These insulators shall be of solid core porcelain or epoxy resin cast, with suitable petticoat design.

(g) The Bus Bar should be colour coded. Busbar shall have heat shrink coatings.

10.0 CIRCUIT BREAKER:

(a) The vacuum circuit breaker shall be draw out type suitable for installation in the switchgear cubicles (indoor). The breaker shall comply with IEC 62271-100 / IS13118 (1991) for circuit breaker and IEC 62271-200 for the switch gear and latest amendment thereof. Construction of breaker shall be such that the points, which require frequent maintenance, shall be easily accessible.

(b) The circuit breakers shall be spring operated, motor/manually charging of the spring feature, manually released. VCB shall have spring closing mechanism for 3 pole simultaneous operation. The speed of closing operation shall be independent of the speed of hand operating level. The indication device shall show the OPEN and CLOSE position of breaker visible from the front of cubical.

(c) The circuit breakers shall be type tested as per IEC 62271.

(d) The breakers shall be capable of making and breaking the short time current in accordance with the requirement of IEC 62271-100 and latest amendment thereof and shall have three phase rupturing capacity of 25KA for 3 second. The continuous current rating of all current carrying parts of breaker shall be 1250 Amps for all items. The total break / make time shall be not more than 4 cycles for break and 6 cycles for make time for all breakers.

(e) Circuit breaker shall be suitable for rapid reclosing cycle i.e. O-0.3 sec.-CO-30 sec.-CO.

(f) The spring release coil for VCB close and VCB trip coil shall both be rated for continuous energization at the rated close / trip voltage. Trip and close coil shall be suitable for 110 V DC as per design of OEM.

(g) Comprehensive interlocking system to prevent any dangerous or inadvertent operation shall be provided. Isolation of circuit breaker from bus bar or insertion into bus bar shall only be possible when the breaker is in the open position.

(h) Vacuum Circuit Breaker shall have completely sealed interrupting units for interruption of arc inside the vacuum. The vacuum interrupter sealed for life.

(i) Vacuum interrupter technical data sheets & outline drawing particularly provided by the manufacturer should also be provided with Bid.

(j) The circuit breaker shall be provided with motor for spring charging operation. Spring charging motor shall be suitable for 250V, 50 Hz, single phase AC and 110 V DC/24 VDC supply as per OEM. Suitable rating starter/fuse shall be provided for Motor protection. Provision shall be available for charging the springs manually as well, and to close CB mechanically.

(k) All circuit breakers shall have mechanical ON/OFF indicator and spring charge indicator. These shall be visible from the front without opening the panel door. Also there shall be provision for mechanical (manual) tripping and also for manual charging of the springs.

(l) The Circuit Breakers of should be mechanically and electrically interchangeable.

(m) Provision for emergency tripping of circuit breaker shall be provided on the switchgear panel. Emergency push button shall be easily accessible to the operator from the front side of the switchgear without requiring opening the VCB door.

(n) Breaker shall be provided with operating handles for easy handling, rack in-out operation and manual spring charging as applicable.

(o) Anti Pumping Relay (94) to be provided in the Breaker panel.

(p) Circuit Breakers Control Switch: Circuit Breakers Control Switches should have finger touch proof terminals. For the convenience of maintenance, screw driver guide should be from top/bottom of the switch and not from the side. Terminal wire should be inserted from the side of the switch terminal. Terminal screws must be captive to avoid misplace during maintenance. Switch shall be with 48 mm x 48 mm escutcheon plate marked with Trip & Close. Circuit Breakers control switch shall be non- discrepancy type Trip-neutral-close, with pistol grip handle must be pushed in to spring return to either trip or close position from Neutral position for safety and not just turn to trip. One contact to close in each position of Trip and Close. Contact not required in Neutral position. Contact rating shall be 12A at 110V DC.

11.0 CABLE CHAMBER:

(a) Two nos., brass, wiping glands for each incomer and one no. Brass wiping gland for each outgoing panel of adequate dimension for XLPE cable of 3 cores up to 400 sq. mm size shall be supplied along with panels. For bus coupler no cable glands should be provided.

(b) All control cable / wire entries shall be by means of suitable cable glands, such

glands shall be of brass and tinned.

(c) Bidder shall design the cable chamber for cable entry from rear bottom side of the switchgear for both Incomer and outgoing feeders, suitable for 3 Core XLPE, 33 KV grade, Aluminium, 300 mm^2.The cable termination height shall be at least 750 mm in the cable compartment.

(d) Provision shall be kept for double cable termination arrangement with two sets of nut and bolts. Copper terminator strip of adequate size shall be provided for termination of cables and shall have adequate height inside to accommodate the heat shrinkable type indoor cable termination.

12.0 CURRENT TRANSFORMER:

The requirement of ratio, VA capacity, class or accuracy etc. for resin cast CTs installed in different type of units shall be such that CTs can cater to the requirement of existing as well as future load growth to the tune of 10 MW.

(a) The designed accuracy should be available even at the lowest ratios.

(b) The secondary terminal of the current transformers shall be such that effective and firm wire terminations are possible. Shorting links of adequate capacity shall be provided at the terminal blocks for sorting of the leads from secondary terminals of current transformers. The secondary terminal of the CTs shall be earthed at one point.

(c) CTs shall confirm to IS 2705 with latest amendment and relevant IEC standard, if any in all respect and will be subjected to all routine and type test specified in the IS/IEC.

(d) The CTs shall be resin/epoxy cast. Contact tips on primary terminals shall be silver plated. Correct polarity shall be invariably marked on each primary and secondary terminals.

(e) Secondary terminal studs shall be provided with at least three nuts, two plain and two spring washers for fixing leads. The stud, nut and washer shall be of brass, duly nickel plated.

13.0 POTENTIAL TRANSFORMER:

(a) 3 phase resin cast, draw out type, bus bar connected, potential transformer of 5-limb construction, ratio 33000/110 volts, class 0.5 accuracy at 50 VA output per phase, complete with HT HRC fuse and Triple Pole & Neutral MCB, rated 1 Amp, with monitoring contacts on PT LV circuit to be used in both incomers. Primary and secondary neutrals of the PT must be brought out and earthed. If required, the busbar connected P.T. may be housed in a separate cubicle. PT mounted on top of the panel will not be acceptable.

(b) H.V side shall be connected in star formation and L.V. side in star/open delta

formation.

(c) PT may be provided in a separate compartment. The primary and secondary contacts (moving & fixed type) shall have firm grip while in service. Service position locking mechanism shall be provided and indicated by bidder in relevant drawing. Rigidity of primary stud point with earth bus in service position shall be confirmed.

(d) Contact tips of primary/secondary contacts shall be silver plated. Correct polarity shall be distinctly marked on primary and secondary terminal.

(e) Secondary terminal studs shall be provided with at least three nuts, two plain and two spring washers for fixing leads. The stud, nut and washer shall be of brass, duly nickel plated.

14.0 NUMERICAL RELAY: Numerical relays shall provide the following minimum protections to 33 kV AIS panel:

33 kV switchgear.	
Incomer Feeders	Minimum 50, 50N,51,51N,51V, 24, 59,27, 81, 87B,
Outgoing Feeder (Transformer)	Minimum 50, 50N,51,51N,51V, 24, 87T, 59,27, 81, 87B, BR, PRV, OTI , WTI , NIFPS
Bus coupler	Minimum 50, 50N,51,51N,51V, 24, 59,27, 81, 87B,

Please refer A14 for detailed specification of Relay.

15.0 MEASURING INSTRUMENTS:

(a) All instruments shall be switchboard type, back connected, suitable for flush mounting and shall comply with the requirements of latent issues of relevant Indian Standards. The instrument cases shall be dust proof, watertight, vermin proof and specially constructed to adequately protect the instruments against damage or deterioration due to high ambient temperature and humidity.

(b) All instruments shall be access adjustable and calibrated before dispatch and shall have means for calibration check and adjustment at site

(c) All voltmeters shall be of digitaltype with direct reading scales.

(d) Multifunction meter (MFM) shall be used in Transformer feeders displaying the minimum following electrical parameters:

I. Phase and Line Voltage
II. Phase Current
III. KW, KVAR, KVA Demand

IV. Maximum and Minimum kW, KVAR, KVA Demand with date and time
V. Powe factor
VI. KWh, KVARh, KVAh

MFM shall have the provision to communicate the data.

(e) Power Quality Analyzer as per relevant standard with latest amendment shall be used in both Incomers for real time monitoring the grid system parameters. Power quality analyzer shall have provision for communication with SCADA for Data retrieval and storage for future analysis.

(f) Static digital tri-vector energy meter suitable for 3-phase 4-wire un-balanced load and CT, PT, ratio mentioned above, 0.5 accuracy class with load, survey and TOD/Tariff and MRI facility (with DLMS protocol compliant – CAT A) to be provided in both incomers. The detailed specification of the tri-vector meter shall be as per the latest technical specification for HT Tri- vector meters.

16.0 AUXILIARY/CONTROL WIRING:

(a) 250 Volts, +/- 10 % variable will be used as auxiliary supply.

(b) Selection of DC voltage shall be done by OEM/Supplier/Designer.

(c) All the secondary wiring in the panel shall be 1100 volts grade single core, FRLS, multistrand flexible tinned copper wires have high quality PVC insulation and the same shall have conductor size of not less than 2.5 mm2 of copper. Colours of the secondary/auxiliary wiring should confirm to IS 375/1963 and latest amendment thereof if any. All wiring shall be neatly run and group of wiring shall be securely fixed by clips so that wiring can be checked without necessity of removing the clamps. Wiring between fixed and moving portion of the panel shall be run in flexible tubes and the same shall be so mounted to avoid any damage to them due to mechanical movements. Ferrules with number shall be provided on both end of the wiring.

(d) All front mounted as well as internally mounted items including MCBs shall be provided with individual identification labels. Labels shall be mounted directly below the respective equipment and shall clearly indicate the equipment designation.

(e) Terminal blocks shall be of screw type design made out of non-trackable insulating material of 1100 V grade. All terminals shall have all current carrying and live parts made of tinned plated brass. The washers, nuts, etc. used for terminal connectors shall also be of tinned plated brass.

(f) At least 20% spare terminals shall be provided. All terminals shall be provided with ferrules indelibly marked or numbered and identification shall correspond to the designations on the relevant wiring diagrams. The terminals shall be rated for adequate capacity which shall not be less than 10 Amps for control circuit. For power circuit it shall not be less than 5 Amps.

(g) All fuses used shall be of HRC type. The fuse base and carrier shall be plug-in type moulded case kitkat of backelite/DMC. All current carrying and live parts shall be of tinned/nickel plated copper. No fuse shall be provided on DC negatives and AC neutrals. Tinned copper links shall, however, be provided on DC negatives and AC neutrals.

(h) All MCBs as per IS:8828/2006 (amended upto date) of adequate rating shall be used.

17.0 INDICATION LAMP: Panel shall have the following indications:

(a) Mechanical: CB ON, CB OFF, Spring Charged / Discharged.

(b) Electrical: Flush mounted type-high intensity, clustered LED lamps to be used for indication. Colour of the lamps shall be as follows:
1) Breaker ON : Red
2) Breaker OFF : Green
3) Spring charged: Blue
4) Auto trip : Amber
5) Test / Service position: White

(c) Indication lamps shall be powered from station DC supply only.

18.0 SUBSTATION AUTOMATION SYSTEM(SAS): The 33 kV switchgear shall be fully compatible with Substation Automation System (SAS). The scope under this tender is SAS-ready switchgear.

Please refer A07 for details.

19.0 ENERGY MANAGEMENT SYSTEM (EMS): The 33 kV switchgear shall be fully compatible with Energy Management System (EMS). The scope under this tender is EMS-ready switchgear.

Please refer A08 for details.

20.0 CONDITION MONITORING / ASSET MONITORING: The 33 kV switchgear shall be fully compatible with Condition Monitoring / Asset Monitoring. The scope under this tender is Condition Monitoring / Asset Monitoring ready switchgear. Following parameters need to be monitored:

a) Busbar temperature monitoring
b) Online partial discharge monitoring
c) Trip coil healthy supervision
d) Close coil healthy supervision
e) Any other parameters

21.0 MARKING OF PARTS:

For facilitating the erection, the several parts of the plant and equipment shall be suitably marked.

22.0 NAME PLATE AND DIAGRAM PLATES:

All equipment shall have weather proof and non-corrosive metal plates fixed in suitable position with full particulars engraved thereon with white letters against black background. The firm shall affix a name plate on each Switchgear panel having the following information:

1. Manufacturer's name and trademark.
2. Serial No.
3. Type of Panel.
4. CT Ratio.
5. Rated Voltage.
6. Rated Insulation Level
7. Rated Frequency
8. Rated Normal Current
9. Rated Short Circuit Breaking Current.
10. Weight
11. Specification No.
12. Order No. and Date
13. Year of supply.

23.0 PAINTING:

All metallic surface [except corrosion resistant aluminium-zinc material and enamelled and bright parts] exposed to weather shall be given suitable primer coat and two coats of first quality paint of approved colour. The supplier shall also supply adequate quantities of paints, varnish etc. for use of finished cost and for use of patching up any scratches received during transport, handling erection testing and commissioning. Instead of above proper powder coating after proper pre treatment is acceptable and in that case earlier condition will not applicable.

24.0 ANNUNCIATION SYSTEM:

Alarm annunciation system shall be provided in the control board by means of visual and audible alarm in order to draw the attention of the operator to the abnormal operating conditions or the operation of some protective devices. The annunciation equipment shall be suitable for operation at station DC supply of the station. Audible annunciation for the failure of dc supply to the annunciation system shall be provided and this annunciation shall operate on 240 Volts ac supply.

25.0 INSPECTION:

Pre-dispatch/Stage-inspection will be carried out by OIL. The contractor/manufacturer shall grant free access to the OIL's representative/s at a reasonable notice (15 days prior) when the work is in progress. Inspection and acceptance of any equipment under this specification by OIL shall not relieve the supplier of his obligation to furnish the equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

The supplier shall keep the purchaser i.e. OIL informed in advance, about the manufacturing program so that arrangement can be made for inspection.

The purchaser reserves the right to insist for witnessing the acceptance/routine testing

of the bought out items. The supplier shall keep the purchaser informed, in advance, about such testing program.

26.0 SPARES: Supplied/OEM shall provide all necessary spares for commissioning of the 33 kV AIS panel at site.
In addition, critical OEM recommended spares shall be provided along with supply of the panel for operation of a minimum of 2 years.

27.0 PACKING AND FORWARDING:

a. The equipment shall be packed in crates suitable for vertical/horizontal transport as the case may be and the packing shall be suitable to withstand handling during the transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable materials shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by the supplier without any extra cost.
b. Each consignment shall be accompanied by a detailed packing list containing the following information:
   (i) Name of the consignee
   (ii) Details of consignment.
   (iii) Destination
   (iv) Total weight of consignment
   (v) Sign showing upper/lower side of the crate.
   (vi) Handling and unpacking instructions.
   (vii) Bill of material indicating contents of each package

28.0 DRAWINGS & DOCUMENTATION:

The successful tenderer shall submit complete drawings along with detailed bill of materials for approval. If any modifications are required on these, the same will be conveyed to the supplier who shall modify the drawings accordingly and furnish final drawings for approval
Successful tenderer shall furnish all above drawings and following additional drawings for approval before commencement of supply.

i. GA of indoor 11 panel Switchgear.
ii. Typical single line diagram for 11 panel Switchgear.
iii. Sectional view of incomer, bus coupler & feeder panels.
iv. GA of Circuit Breaker truck.
v. GA of Current Transformer
vi. GA of Potential Transformer.
vii. G. A. Drawing for Control Desk.
viii. Bill of material for complete switchgear.
ix. Technical particulars of Switchgears.
x. Logia Diagram of Relays
xi. Foundation details.
xii. Equipment door layout for incomer, bus coupler & feeder panels.
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GTP-1: 33 KV Air Insulated Switchboard

Sl. No	Particulars / Item Description	Desired Parameter	Bidder's Response
1	Enclosure Material	CRCA Steel / Al-Zn, dust & vermin proof	
2	Sheet Thickness (Load Bearing)	≥ 3 mm	
3	Sheet Thickness (Non-load/Doors)	≥ 2 mm	
4	Tropicalization	IEC 60932 Class 2 compliant	
5	Degree of Protection (HV/LV)	IP52 (Relay), IPH2 (Live parts)	
6	Panel Construction	Single front, single tier, compartmentalized	
7	Busbar Rating	1250 A continuous	
8	Busbar Short Time Rating	25 kA / 3 sec	
9	Busbar Material	Electrolytic Copper	
10	Busbar Insulation	Heat shrink, colour coded	
11	Phase Clearance	As per IEC 62271 / IS 13118	
12	Bus Support Insulator	Epoxy/Porcelain, type tested	
13	Internal Arc Classification	25 kA, 1 sec, AFLR (IEC 62271-200)	
14	Circuit Breaker Type	Vacuum, draw-out, horizontal isolation	
15	CB Rated Voltage	33 kV	
16	CB Continuous Current	1250 A	
17	CB Breaking Capacity	25 kA	
18	CB Making Capacity	As per IEC 62271-100	
19	CB Operating Duty	O–0.3s–CO–30s–CO	
20	CB Operating Mechanism	Spring operated, motor/manual charging	
21	CB Control Voltage	110 V DC	
22	Closing Time / Opening Time	≤ 6 cycles / ≤ 4 cycles	
23	Interlocking	Mechanical & electrical, full interlock	
24	CT Ratio	100–200/5 A	
25	CT Accuracy	0.5S (Metering), 5P10 / PS (Protection)	
26	CT Burden	5 VA / 10 VA	
27	CT Standard	IS 2705 / IEC	
28	PT Ratio	33 kV / 110 V	
29	PT Accuracy	Class 0.5, 50 VA	
30	PT Type	Draw-out, resin cast	
31	PT Protection	HT HRC fuse + TPN MCB (1A)	
32	Numerical Relay (Incomer)	50, 50N, 51, 51N, 51V, 24, 59, 27,	

		81, 87B	
33	Numerical Relay (Outgoing)	50, 51, 87T, OTI, WTI, PRV, etc.	
34	Numerical Relay (Bus Coupler)	50, 50N, 51, 51N, 24, 59, 27, 81, 87B	
35	Cable Entry	Rear bottom	
36	Cable Type	33 kV, 3C XLPE, 300 mm² Al	
37	Cable Termination Height	≥ 750 mm	
38	Glands	Brass wiping (2 incomer, 1 outgoing)	
39	Auxiliary Supply	250 V DC ±10%	
40	Control Wiring	1100 V grade, 2.5 sq.mm Cu, FRLS	
41	Terminal Blocks	1100 V grade, tinned brass, screw type	
42	Spare Terminals	≥ 20%	
43	Indications (Electrical)	Red/Green/Blue/Amber/White LEDs	
44	Indications (Mechanical)	ON/OFF, Spring charged	
45	Metering	Digital meters, MFM, PQ Analyzer	
46	Energy Meter	Tri-vector, 0.5 class, DLMS	
47	SAS Compatibility	Required (SAS-ready)	
48	EMS Compatibility	Required (EMS-ready)	
49	Condition Monitoring	Bus temp, PD, coil health	
50	Earthing	Dual earth terminals + Cu earth bus	
51	Painting	Powder coating, 7 tank / sand blasting	
52	Annunciation	Visual + audible (DC + AC fail alarm)	
53	Packing	Suitable for transport & storage	
54	Inspection	Pre-dispatch by purchaser	
55	Spares	Commissioning + 2 years critical spares	
56	Name Plate Details	As per specification (engraved metal)	
57	Internal Arc Protection	Provided	
58	Power Quality Analyzer	Yes (Incomers)	
59	Tri-vector Meter	Yes	
60	Asset Monitoring	Yes	
61	SAS Integration	Yes	
62	EMS Integration	Yes	
63	Guarantee	Minimum 2 years (or as per tender)	
64	Accessories	Handles, tools for operation	
65	Lifting Arrangement	Provided	

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TECHNICAL SPECIFICATION NO - A02
11KV SWITCBOARD

1.0 SCOPE of WORK:

This Specification covers the design and engineering, manufacture, testing at the manufacturer's factory, painting, packing for transport, insuring, transportation by road and delivery & unloading of 11 KV air insulated Indoor type, Metal Clad, Self Supported, Single copper Busbar arrangement, horizontal draw out type vacuum Circuit Breaker (VCB) having SCADA compatibility along with all accessories as specified in this tender at OIL's site i.e. Moran Power Station. The 11 KV Switchgear will be located inside E-House. Bidder shall develop a final layout for 11 KV Switchgear panel line up in compliance to minimum spaces as per CEA Regulation.

2.0 UNIT OF MEASUREMENT AND LANGUAGE:

In all correspondence, in all technical schedules and on all drawings prepared by the manufacturer, the metric units of measurement shall be used. On drawings or printed pamphlets where other units have been used, the equivalent metric measurements shall be added. All documents, correspondence, drawings, reports, operating and maintenance instructions/ manuals and nameplate details of the equipment shall be in English language.

3.0 System Parameter:

a) Type: Air insulated Switchgear Indoor Type
b) System voltage: 11 KV
c) Highest system voltage: 12 KV
d) Number of phase: Three
e) Power frequency: 50 Hz(+/-) 3%
f) System earthing: Neutral grounding resistance.
g) Rated short time withstand current: 25 kA
h) Rated insulation voltage: 12 kV
i) Rated power frequency withstand voltage kV (1min): 28 kV
j) Rated lightning impulse withstand voltage(kV): 75 kV
k) Internal arc withstand current(1s): 25 kA
l) Busbar current rating: Min 1250 A
m) Busbar Material: Coper (rectangular Shape)

4.0 Switchgear Configuration:

The 11 KV Switchgear shall comprise of the following:

a) Incomer: Two (02) Nos
b) Outgoing Feeder: Ten (10) Nos
c) Transformer Feeder: Two (02) Nos
d) Bus Coupler: One (01) Nos
e) Interconnector: Two (02) nos.

Kindly refer to the **A0.1** for single line diagram

5.0 General Requirements:

(a) The design, dimensions and materials of all parts shall be such that they will not suffer damage under the most adverse conditions nor result in deflections and

vibrations, which might adversely affect the operation of the equipment. Mechanisms shall be constructed to avoid sticking due to rust or corrosion.

(b) The equipment and apparatus shall be designed and manufactured in the best and most substantial and workmanlike manner with materials best suited to their respective purpose and generally in accordance with up-to-date recognized standards of good practice.

(c) Whenever possible, all similar parts, including spare parts, shall be made interchangeable. Such parts shall be of the same materials and workmanship and shall be constructed to such tolerances as to enable substitution or replacement by spare parts easily and quickly.

(d) All equipment shall be designed to minimise the risk of fire and consequential damage, to prevent ingress of vermin and dust and accidental contact with electrically energized or moving parts. The switchgear panels shall be capable of continuous operation with minimum attention and maintenance in the exceptionally severe conditions likely to be obtained in a tropical climate and where the switchgear is called upon to frequently interrupt fault currents on the system and where the duty of operation is high.

(e) Suitable lifting hooks need to be provided for lifting of the equipment.

(f) All steel castings and welding shall be stress-relieved by heat treatment before machining, and castings shall be stress-relieved again after repairing welding.

(g) Liberal factors of safety shall be used throughout, especially in the design of all parts subject to alternating stresses or shocks.

6.0 Guideline for AC & DC Auxiliary power supply:

Low voltage equipment and installation shall be designed in accordance with EMC (Electromagnetic Compatibility, IEC 61000) directives. The rating and design criteria for low voltage equipment shall be as follows:

A) AC Supply Rating System:

(i) Rated 3 phase Voltage: 433 V AC
(ii) Connection type 3ph 4wire
(iii) Rated phase Voltage 250 V AC
(iv) Grounding system: Solid Earthing
(v) Frequency 50 HZ
(vi) Voltage variation ± 10 %
(vii) Frequency variation ± 5%
(viii) Power frequency 1 min, Test Voltage 3 kV
(ix) Thermal rating of conductors 120 % of load

The AC supply shall be used for power circuits and for lighting, indication, motor controls etc. Unless otherwise specified, the equipment provided under this tender is to be capable of reliable operation at voltages as low as 85% of the rated voltage, and to withstand continuously up to 110% supply voltage above the rated value of 250V.

B) DC Auxiliary Supply Rating:

110 V DC system to be designed by OEM considering the back up time to be min. 3 hrs. The auxiliary dc supply shall be used for controls, indication, alarm, circuit breaker tripping and closing circuit, emergency lighting etc. All equipment and apparatus including the circuit breakers, control devices and accessories, measuring and indicating instruments and electronic equipment shall be capable of satisfactory operation at 80% to 130% of the rated dc supply voltage. However, in case of VCB, for tripping the range should be 70% to 110% and for closing that should be 85% to 110%.

7.0 Electrical controls, auxiliaries and power supplies:

a. Responsibility for electrical control and auxiliary.
The manufacturer shall provide all control, indication, alarm and all auxiliary equipment with wiring and interconnecting cable which are integral parts of or are directly associated with or mounted on the switchgear panels to be supplied under this tender. The design of protection and control schemes for the switchgear panels shall be subject to approval of OIL.

b. Operation and control.
Interlocking devices shall be incorporated in the control circuit to ensure safety, and proper sequence and correct operation of the equipment. The scheme will be finalized during detailed engineering and drawing approval.

c. Corona and radio interference

I. Switchgear shall electrically be designed to avoid local corona formation and discharge likely to cause radio interference.

II. The design of jointing of adjacent metal parts and surfaces shall be such as to prevent corrosion of the contact surfaces and to maintain good electrical contact under service conditions.

III. Care shall be taken during manufacture of bus bar and fittings and during subsequent handling to ensure smooth surface free from abrasion. All joints on the bus bar and the circuit within the switchgear board shall be silver or tin-plated to ensure good electrical connection.

All the plant / apparatus / equipment supplied shall comply in all respect with the requirement of Indian Electricity Act 2003 and CEA Regulation/IS and latest amendment thereof during the execution of contract where-ever applicable.

8.0 GENERAL TECHNICAL/CONSTRUCTIONAL REQUIREMENTS:

a) Tropicalization: All equipment must be designed for operations in the severe tropic climate conditions and fully comply with climatic aging tests as per IEC 60932-class 2. In choosing materials their finishes, due regard shall be given to the humid tropical conditions under which the switchgear will be called upon to work. The manufacturer shall submit details of his usual practice which have proven satisfactory for application to the parts of the Switchgear panels, which

may be affected by tropical conditions.

b) Metals: Iron and Steel are generally to be painted or galvanized as appropriate. Indoor parts may alternatively have chromium or copper-nickel plates or other approved protective finish. Small iron and steel parts (other than rustless steel) of all instruments and electrical equipment, the cores of electromagnets and the metal parts of relays and mechanisms shall be treated in an appropriate manner to prevent rusting.

c) Screws, Nuts, Springs, etc.: The use of iron and steels shall be avoided in instruments and electrical relays wherever possible. Steel screws shall be zinc, cadmium or chromium plated or where plating is not possible owing to tolerance limitations, shall be of corrosion resisting steel. Instrument screws (except those forming part of a magnetic circuit) shall be of brass or bronze. Springs shall be of non-rusting material, e.g., phosphor-bronze or nickel silver, as far as possible.

d) Rubbers: Neoprene and similar synthetic compounds, not subject to deterioration due to the climatic conditions, shall be used for gaskets, sealing rings, diaphragms, etc.

e) The switchgear shall be of CRCA steel / corrosion proof aluminium-zinc construction with sheet not less than 3 mm thickness for load bearing section and not less than 2mm thickness for non-load bearing and shall totally dust and vermin proof. However, if vendor has standardized the thickness of enclosure other than above mentioned and it meets the performance requirements and the design has been established through type test, the same shall be accepted. The panels shall be rigid without using any external bracings. The switchboard panels should comply with relevant IS / IEC and revision thereof and shall be designed for easy operation maintenance and further extension.

f) Each circuit have a separate vertical panel with distinct compartments. Bus bar, metering, circuit breaker chamber, cables and cable box chamber should have proper access for maintenance and proper interlocks should be provided. The switchgear shall be completed with all necessary wiring, fuses, auxiliary contacts, terminal boards etc.

g) The switchgear boards shall have a single front, single tier, fully compartmentalized, metal enclosed construction, comprising of row of freestanding floor mounted panels. The adjacent panels shall be completely separated by steel sheets except in busbar compartments. The switchgear assembly shall be dust, moisture, rodent and vermin proof, with the truck in any position SERVICE, ISOLATED, TEST or removed, and all doors and covers closed. All doors, removable covers and glass windows shall be gasketted all round with synthetic rubber or neoprene gaskets.

h) The arcing contacts and bus bar should be rated for minimum 25 KA faults for 3 seconds for 11kV system. Bus bars shall be capable of connecting one switchgear panel to other through proper insulated arrangement. The panels shall be modular in design.

i) All relays, meters, breaker control switches, selector switches and indicator lamps shall be flush mounted on the respective cubicles door or on the control cabinet build on the front of the cubicle. AC/DC auxiliary supply switches/isolation switches for the cubicle space heater, cubicle lamp, spring charging motor circuit shall be located inside metering compartment.

j) The breakers should be able to be drawn out in horizontal position at ground level [with vertical/horizontal isolation]. When breaker is drawn out in horizontal position none of the live components inside the 11KV switchgear panel should be accessible. The safety shutters shall be robust and shall automatically cover the live components when the breaker is drawn out. The switchgear shall have complete interlocking arrangements at the fully inserted and fully drawn out and test positions. Withdrawal of the breaker should not be possible in ON position, it should not be possible to close the circuit breaker in service unless the entire auxiliary and control circuit are connected.

k) Circuit breaker shall be draw out type housed in a separate cubicle of the switchboard and shall be enclosed from all sides. A sheet steel hinged lockable door shall be at the front. It shall be possible to withdraw the circuit breaker to 'Test' and "Isolated' position with the door closed. Door interlock shall be provided such that the door can only be opened after withdrawing the breaker to 'Isolated' position and the breaker cannot be racked into the 'Service' position unless the door is closed. A visual indication as to show when the breaker is in 'Service', 'Test' or 'Isolated' position shall be provided in front of the door.

l) Switchgear construction shall have a bushing or other sealing arrangement between the circuit breaker compartment and the busbar / cable compartment, so that there is no air communication around the isolating contacts in the shutter area with the truck in service position.

m) The breaker and the auxiliary compartments provided on the front side shall have strong hinged doors, busbar and cabling compartments provided on the rear side have bolted compartment covers with self retaining bolts. Breaker compartment doors shall have Lock Out Tag Out (LOTO) locking facility.

n) All the high voltage compartments must have pressure discharge flap for the exit of gas due to internal arc to insure operator safety. All the HV compartment design shall ensure conformity to IEC-60298 and must be type tested at 25 kA for 1 second for IAC classification and duration as per IEC As per IEC 62271-200 clause A. 4.5 (AFLR).

o) Two separate earthing terminals shall be provided in each panel and shall be connected to the earth bus within the panel. The earth bus shall be of copper and shall have adequate cross-sectional area.

p) The bus PT/relay compartments shall have degree of protection not less than IP:52 in accordance with IS:2147. However, remaining compartments can have a degree of protection of IP:42. All louvers if provided shall have very fine brass or GI mesh screen, IPH-2 degree of protection as per IS: 3427 to all live parts shall (whether isolated or removed from panel) even when the breaker compartment door is open. Tight fitting garments / gaskets are to be provided at all openings in relay compartment.

q) The switchboard shall have the facility of extension on the both sides of Adapter panels and dummy panels required to meet the Busbar.

9.0 BUS BARS AND CONNECTORS:

a) The main buses and connections shall be sized for specified current ratings with maximum temperature as per the type tested and ratified design. The bus bars section should have ample capacity to carry the rated current of minimum 1250

Amps in panel current rating at an ambient temperature of 40 deg C, continuously without excessive heating and for adequately meeting the thermal and dynamic stresses in the case of short circuit in the system up to full STC rating of 25kA for 3 sec.The Current density of 1.6Amps/sq. mm shall be considered for the bus bars.

b) All bus bars connections shall be firmly and rigidly mounted on suitable insulators to withstand short circuit stresses and vibrations. 'Self-supported busbar' design will be acceptable if the same is ratified by type tests for the specified rating and busbar support drawings approved during type tests shall be furnished with the offer.

c) All fasteners (Nuts Bolts) used for bus bar connections shall be of non-magnetic stainless steel. Only Belleville type washers shall be provided for each nut bolt. If the fasteners used are not of stainless steel the bidder shall state in their offer the material used and confirm that the same is non-magnetic and is superior to stainless steel.

d) Adequate clearance between 11 kV point and earth and between phase shall be provided to ensure safety in accordance with the relevant Indian standard specification and the same shall be capable of withstanding the specified high voltage tests as per IEC 62271-200 / IS 13118 and amendment thereof.

e) Sharp edges and bends either in the bus bars or bus bar connections shall be avoided as far as possible. Wherever such bends or edges are un-avoidable, suitable compound or any other insulation shall be supplied to prevent local ionization and consequent flashover.

f) The bus bars along with their supporting insulators etc. shall have a short time current rating of 25 KA for 3 sec. Test certificate of bus bar for rated STC rating shall be submitted, along with the bid. This shall be confirmed by the tenderers in their technical offer. These insulators shall be of solid core porcelain or epoxy resin cast, with suitable petticoat design. Insulators shall have a cantilever strength of not less than 1200 KgF.

g) The Bus Bar should be colour coded. Busbar shall have heat shrink coatings.

10.0 CIRCUIT BREAKER:

a) The vacuum circuit breaker shall be draw out type suitable for installation in the switchgear cubicles (Indoor). The breaker shall comply with IEC 62271-100 / IS-13118 (1991) for circuit breaker and IEC 62271-200 for the switch gear and latest amendment thereof. Construction of breaker shall be such that the points, which require frequent maintenance, shall be easily accessible.

b) The circuit breakers shall be spring operated, motor/manually charging of the spring feature, manually released. VCB shall have spring closing mechanism for 3 pole simultaneous operation. The speed of closing operation shall be independent of the speed of hand operating level. The indication device shall show the OPEN and CLOSE position of breaker visible from the front of cubical.

c) The circuit breakers shall be type tested as per IEC 62271.

d) The breakers shall be capable of making and breaking the short time current in accordance with the requirement of IEC 62271-100 / IS 13118 (1991) and latest amendment thereof and shall have three phase rupturing capacity of 25KA for 3 second at 11 KV. The continuous current rating of all current carrying parts

of breaker shall be 1250 Amps for all items. The total break / make time shall be not more than 4 cycles for break and 6 cycles for make time for all breakers.

e) Circuit breaker shall be suitable for rapid reclosing cycle i.e. O-0.3 sec.-CO-30 sec.- CO.

f) The spring release coil for VCB close and VCB trip coil shall both be rated for continuous energization at the rated close / trip voltage. Trip and close coil shall be suitable for 110 V DC as per design of OEM.

g) The vacuum circuit breakers shall ensure high speed extinction and adequate control of pressure during breaking of current and also designed to limit excessive over voltages.

h) Comprehensive interlocking system to prevent any dangerous or inadvertent operation shall be provided. Isolation of circuit breaker from bus bar or insertion into bus bar shall only be possible when the breaker is in the open position.

i) Vacuum Circuit Breaker shall have completely sealed interrupting units for interruption of arc inside the vacuum. The vacuum interrupter sealed for life.

j) Vacuum interrupter technical data sheets & outline drawing particularly provided by the manufacturer should also be provided with Bid.

k) The circuit breaker shall be provided with motor for spring charging operation. Spring charging motor shall be suitable for 250V, 50 Hz, single phase AC and 110 V DC supply as per OEM. Suitable rating starter/fuse shall be provided for Motor protection. Provision shall be available for charging the springs manually as well, and to close CB mechanically.

l) All circuit breakers have mechanical ON/OFF indicator and spring charge indicator. These shall be visible from the front without opening the panel door. Also there shall be provision for mechanical (manual) tripping and also for manual charging of the springs.

m) The Circuit Breakers of should be mechanically and electrically interchangeable.

n) Provision for emergency tripping of circuit breaker shall be provided on the switchgear panel. Emergency push button shall be easily accessible to the operator from the front side of the switchgear without requiring opening the VCB door.

o) Breaker shall be provided with operating handles for easy handling, rack in-out operation and manual spring charging as applicable.

p) Anti Pumping Relay (94) to be provided in the Breaker panel.

q) Circuit Breakers Control Switches should have finger touch proof terminals. For the convenience of maintenance, screw driver guide should be from top/bottom of the switch and not from the side. Terminal wire should be inserted from the side of the switch terminal.

r) Terminal screws must be captive to avoid misplace during maintenance.

s) Switch shall be with 48 mm x 48 mm escutcheon plate marked with Trip & Close.

t) Circuit Breakers control switch shall be non- discrepancy type

u) Trip-neutral-close, with pistol grip handle must be pushed in to spring return to either trip or close position from Neutral position for safety and not just turn to trip.

11.0 Cable Chamber:

a) Bidder shall design the cable chamber for cable entry from rear bottom side of the switchgear for both Incomer and outgoing feeders, suitable for 3 Core XLPE, 11 KV grade, Aluminium, 240 mm^2.The cable termination height shall be at least 750 mm in the cable compartment.

b) Provision shall be kept for double cable termination arrangement with two sets of nut and bolts. Copper terminator strip of adequate size shall be provided for termination of cables and shall have adequate height inside to accommodate the heat shrinkable type indoor cable termination.

c) Two nos., brass, wiping glands for each incomer and one no. Brass wiping gland for each outgoing panel of adequate dimension for XLPE cable of 3 cores up to 400 sq. mm size shall be supplied along with panels. For bus coupler no cable glands should be provided.

d) All control cable / wire entries shall be by means of suitable cable glands, such glands shall be of brass and tinned.

12.0 CURRENT TRANSFORMERS: The requirement of ratio, VA capacity, class or accuracy etc. for resin cast CTs installed in different types of units shall be such that it meets the existing load requirement as well as future load growth to the tune of 10 MW at 11 KV.

a) The designed accuracy should be available even at the lowest ratios.
b) The secondary terminal of the current transformers shall be such that effective and firm wire terminations are possible. Shorting links of adequate capacity shall be provided at the terminal blocks for sorting of the leads from secondary terminals of current transformers. The secondary terminal of the CTs shall be earthed at one point
c) CTs shall confirm to IS 2705 with latest amendment and relevant IEC standard, if any in all respect and will be subjected to all routine and type test specified in the IS/IEC.
d) The CTs shall be resin/epoxy cast. Contact tips on primary terminals shall be silver plated. Correct polarity shall be invariably marked on each primary and secondary terminals.
e) Secondary terminal studs shall be provided with at least three nuts, two plain and two spring washers for fixing leads. The stud, nut and washer shall be of brass, duly nickel plated.

13.0 POTENTIAL TRANSFORMERS:

a) 1 No. 3 phase resin cast, draw out type, bus bar connected, potential transformer of 5-limb construction, ratio 11000/110 volts, class 0.5 accuracy at 50 VA output per phase, complete with HT HRC fuse and Triple Pole & Neutral MCB, rated 1 Amp, with monitoring contacts on PT LV circuit to be used. Primary and secondary neutrals of the PT must be brought out and earthed. If required, the busbar connected P.T. may be housed in a separate cubicle. PT mounted on top of the panel will not be acceptable.

b) H.V side shall be connected in star formation and L.V. side in star/open delta formation.

c) PT may be provided in a separate compartment. The primary and secondary contacts (moving & fixed type) shall have firm grip while in service. Service position locking mechanism shall be provided and indicated by bidder in relevant drawing. Rigidity of primary stud point with earth bus in service position shall be confirmed.

d) Contact tips of primary/secondary contacts shall be silver plated. Correct polarity shall be distinctly marked on primary and secondary terminal.

e) Secondary terminal studs shall be provided with at least three nuts, two plain and two spring washers for fixing leads. The stud, nut and washer shall be of brass, duly nickel plated. The minimum outside diameter of the studs shall be 6 mm. The length of at least 15 mm shall be available on the studs for inserting the leads. The space clearance between nuts on adjacent studs when fitted shall be at least 10 mm.

14.0 Numerical relay: Numerical relay installed in the 11 kV AIS panel shall be able to provide the following minimum protection:

11 kV switchgear	
Feeder	Protection
Feeder	Protection
Incomer Feeder	Minimum 50, 50N,51,51N,51V, 87T, 64 REF, 59,27, 81, 87B,
Bus coupler	Minimum 50, 50N,51,51N,51V, 87B
Tie feeder	Minimum 50, 50N,51,51N,51V, 87B, 67N
Station Transformer Feeder	Minimum 50, 50N,51,51N, PRV, OTI, WTI
Solar +BESS	Minimum 50, 50N,51,51N,
APFC	Minimum 50, 50N,51,51N,
Outgoing Feeder	Minimum 50, 50N,51,51N,

For detailed specification of the numerical relay, please refer A14.

15.0 MEASURING INSTRUMENTS:

a) All instruments shall be switchboard type, back connected, suitable for flush mounting and shall comply with the requirements of latent issues of relevant Indian Standards. The instrument cases shall be dust proof, water tight, vermin proof and specially constructed to adequately protect the instruments against damage or deterioration due to high ambient temperature and humidity.

b) All instruments shall be access adjustable and calibrated before dispatch and shall have means for calibration check and adjustment at site.

c) All ammeters shall be digital type with direct reading scales. The scale value of

ammeters shall be as per the primary current ratings of the associated current transformers. The rated current of ammeter elements shall be 5 Amperes and Accuracy class 1.0 as per IS: 1248.

d) All voltmeters shall be of digital type with direct reading scales. The maximum scale value of voltmeters shall be 50% in access of the primary voltage of associated PT. The rated voltage of the voltmeters shall be 110 volts A.C. and accuracy class shall be1.0 as per IS: 1248.

e) Multifunction meter (MFM) shall be used in feeders for displaying the minimum following electrical parameters:
   i) Phase and Line Voltage
   ii) Phase Current
   iii) KW, KVAR, KVA Demand
   iv) Maximum and Minimum kW, KVAR, KVA Demand with date and time
   v) Powe factor
   vi) KWh, KVARh, KVAh
   vii) THD in current and Voltage
   viii) MFM shall have the provision to communicate the data.

f) Static digital tri-vector energy meter suitable for 3-phase 4-wire un-balanced load and CT, PT, ratio mentioned above, 0.5 accuracy class with load, survey and TOD/Tariff and MRI facility to be provided in both incomers.
   Please refer A15 for detailed specifications of the tri-vector meter.

16.0 Auxiliary/Control Wiring:

a) 250 Volts, +/- 10 % variable will be used as auxiliary supply.

b) Selection of DC voltage shall be done by OEM/Supplier/Designer.

c) All the secondary wiring in the panel shall be 1100 volts grade single core, FRLS, multistrand flexible tinned copper wires have high quality PVC insulation and the same shall have conductor size of not less than 2.5 mm2 of copper. Colours of the secondary/auxiliary wiring should confirm to IS 375/1963 and latest amendment thereof if any. All wiring shall be neatly run and group of wiring shall be securely fixed by clips so that wiring can be checked without necessity of removing the clamps. Wiring between fixed and moving portion of the panel shall be run in flexible tubes and the same shall be so mounted to avoid any damage to them due to mechanical movements. Ferrules with number shall be provided on both end of the wiring.

d) All front mounted as well as internally mounted items including MCBs shall be provided with individual identification labels. Labels shall be mounted directly below the respective equipment and shall clearly indicate the equipment designation.

e) Terminal blocks shall be of screw type design made out of non-trackable insulating material of 1100 V grade. All terminals shall have all current carrying and live parts made of tinned plated brass. The washers, nuts, etc. used for terminal connectors shall also be of tinned plated brass.

f) At least 20% spare terminals shall be provided. All terminals shall be provided with

ferrules indelibly marked or numbered and identification shall correspond to the designations on the relevant wiring diagrams. The terminals shall be rated for adequate capacity which shall not be less than 10 Amps for control circuit. For power circuit it shall not be less than 5 Amps.

g) All fuses used shall be of HRC type. The fuse base and carrier shall be plug-in type moulded case kitkat of backelite/DMC. All current carrying and live parts shall be of tinned/nickel plated copper. No fuse shall be provided on DC negatives and AC neutrals. Tinned copper links shall, however, be provided on DC negatives and AC neutrals.

h) All MCBs as per IS:8828/2006 (amended upto date) of adequate rating shall be used.

17.0 Indication Lamp: Panel shall have the following indications:

a) Mechanical: CB ON, CB OFF, Spring Charged / Discharged.

b) Electrical: Flush mounted type-high intensity, clustered LED lamps to be used for indication. Colour of the lamps shall be as follows:

I. Breaker ON : Red
II. Breaker OFF : Green
III. Spring charged: Blue
IV. Auto trip : Amber
V. Test / Service position: White

c) Indication lamps shall be powered from the DC station supply only.

18.0 Substation Automation System (SAS): The 33 kV switchgear shall be fully compatible with Substation Automation System (SAS). The scope under this tender is SAS-ready switchgear.
Please refer A07 for details.

19.0 Energy Management System (EMS): The 33 kV switchgear shall be fully compatible with Energy Management System (EMS). The scope under this tender is EMS-ready switchgear.
Please refer A08 for details.

20.0 Condition Monitoring / Asset Monitoring: The 33 kV switchgear shall be fully compatible with Condition Monitoring / Asset Monitoring. The scope under this tender is Condition Monitoring / Asset Monitoring ready switchgear. Following parameters need to be monitored:

a. Busbar temperature monitoring
b. Online partial discharge monitoring
c. Trip coil healthy supervision
d. Close coil healthy supervision
e. Any other parameters

21.0 MARKING OF PARTS:

For facilitating the erection, the several parts of the plant and equipment shall be suitably marked.

22.0 NAME PLATE AND DIAGRAM PLATES:

All equipment shall have weather proof and non-corrosive metal plates fixed in suitable position with full particulars engraved thereon with white letters against black background. The firm shall affix a name plate on each Switchgear panel having the following information:

1. Manufacturer's name and trademark.
2. Serial No.
3. Type of Panel.
4. CT Ratio.
5. Rated Voltage.
6. Rated Insulation Level
7. Rated Frequency
8. Rated Normal Current
9. Rated Short Circuit Breaking Current.
10. Weight
11. Specification No.
12. Order No. and Date
13. Year of supply.

23.0 PAINTING:

All metallic surface [except corrosion resistant aluminium-zinc material and enamelled and bright parts] exposed to weather shall be given suitable primer coat and two coats of first quality paint of approved colour. The supplier shall also supply adequate quantities of paints, varnish etc. for use of finished cost and for use of patching up any scratches received during transport, handling erection testing and commissioning. Instead of above proper powder coating after proper pre treatment is acceptable and in that case earlier condition will not applicable.

24.0 ANNUNCIATION SYSTEM:

Alarm annunciation system shall be provided in the control board by means of visual and audible alarm in order to draw the attention of the operator to the abnormal operating conditions or the operation of some protective devices. The annunciation equipment shall be suitable for operation at station DC supply of the station. Audible annunciation for the failure of dc supply to the annunciation system shall be provided and this annunciation shall operate on 250 Volts ac supply.

25.0 INSPECTION:

Pre-dispatch/Stage-inspection will be carried out by OIL. The contractor/manufacturer shall grant free access to the OIL's representative/s at a reasonable notice (15 days prior) when the work is in progress. Inspection and acceptance of any equipment under this specification by OIL shall not relieve the supplier of his obligation to furnish the equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

The supplier shall keep the purchaser i.e. OIL informed in advance, about the

manufacturing program so that arrangement can be made for inspection.

The purchaser reserves the right to insist for witnessing the acceptance/routine testing of the bought-out items. The supplier shall keep the purchaser informed, in advance, about such testing program.

26.0 PACKING AND FORWARDING:

The equipment shall be packed in crates suitable for vertical/horizontal transport as the case may be and the packing shall be suitable to withstand handling during the transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable materials shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by the supplier without any extra cost.

Each consignment shall be accompanied by a detailed packing list containing the following information:

a. Name of the consignee
b. Details of consignment.
c. Destination
d. Total weight of consignment
e. Sign showing upper/lower side of the crate.
f. Handling and unpacking instructions.
g. Bill of material indicating contents of each package.

27.0 DRAWINGS & DOCUMENTATION:

The successful tenderer shall submit complete drawings along with detailed bill of materials for approval. If any modifications are required on these, the same will be conveyed to the supplier who shall modify the drawings accordingly and furnish final drawings for approval

Successful tenderer shall furnish all above drawings and following

additional drawings for approval before commencement of supply.

a) GA of indoor 11 panel Switchgear.
b) Typical single line diagram for 11 panel Switchgear.
c) Sectional view of incomer, bus coupler & feeder panels.
d) GA of Circuit Breaker truck.
e) GA of Current Transformer
f) GA of Potential Transformer.
g) G. A. Drawing for Control Desk.
h) Bill of material for complete switchgear.
i) Technical particulars of Switchgears.
j) Logia Diagram of Relays
k) Foundation details.
l) Equipment door layout for incomer, bus coupler & feeder panels.
m) Schematic Diagram for incomer bus coupler & feeder section of Switchgear
n) Protection Circuit for incomer bus coupler & feeder section of Switchgear

o) DC control circuit for incomer, bus coupler & feeder section.
p) Metering circuit for incomers, bus coupler & feeder section.
q) Annunciator and Alarm scheme.
r) P.T. supply change over scheme.
s) Terminal block details for incomer, bus coupler & feeder section.
t) Cross section view for CTs.
u) Name Plate & Connection diagram for CTs.
v) Cross section view for PTs.
w) Name Plate & Connection diagram for PTs.

GTP-2: 11 KV Air Insulated Switchboard

Sl. No	Particulars / Item Description	Desired Parameter	Bidder's Response
1	Type of Switchgear	Indoor, Air Insulated, Metal Clad	
2	System Voltage	11 kV	
3	Highest System Voltage	12 kV	
4	Frequency	50 Hz (±3%)	
5	Number of Phases	3 Phase	
6	System Earthing	Resistance Grounded Neutral	
7	Rated Insulation Voltage	12 kV	
8	Power Frequency Withstand Voltage	28 kV (1 min)	
9	Lightning Impulse Withstand	75 kV	
10	Short Time Withstand Current	25 kA	
11	Internal Arc Rating	25 kA, 1 sec (AFLR)	
12	Busbar Current Rating	≥ 1250 A	
13	Busbar Material	Electrolytic Copper (Rectangular)	
14	Busbar STC Rating	25 kA / 3 sec	
15	Busbar Jointing	Silver/Tin plated	
16	Configuration	2 Incomer + 10 Outgoing + 2 Transformer + 1 Bus Coupler + 2 Interconnector	
17	Panel Construction	Single front, single tier, compartmentalized	
18	Enclosure Material	CRCA Steel / Al-Zn	
19	Sheet Thickness (Load Bearing)	≥ 3 mm	
20	Sheet Thickness (Non-load)	≥ 2 mm	
21	Degree of Protection (Relay/PT)	IP52	
22	Degree of Protection (Other)	IP42	
23	Tropicalization	IEC 60932 Class 2	
24	Circuit Breaker Type	Vacuum, Draw-out	
25	CB Rated Voltage	11 kV	
26	CB Continuous Current	1250 A	
27	CB Breaking Capacity	25 kA	
28	CB Operating	Spring operated (motor/manual)	

	Mechanism		
29	CB Operation	Horizontal draw-out, isolated/test/service positions	
30	Interlocking	Mechanical & Electrical	
31	Internal Arc Protection	Pressure relief flap provided	
32	Earthing	2 terminals + Copper earth bus	
33	Auxiliary AC Supply	433 V, 3 Phase, 4 Wire	
34	Auxiliary DC Supply	110 V DC (3 hr backup)	
35	DC Operating Range	80–130% (Trip: 70–110%, Close: 85–110%)	
36	Control Responsibility	Complete control, wiring & auxiliaries	
37	Control Wiring	FRLS Cu, 1100 V grade	
38	EMC Compliance	IEC 61000	
39	Corona / RI	No corona / radio interference	
40	Busbar Surface	Smooth, free from abrasion	
41	Inter-panel Connection	Insulated bus extension	
42	Safety Features	Dust, vermin, moisture proof	
43	Accessibility	Fully compartmentalized, easy maintenance	
44	Breaker Safety	No live part access in withdrawn condition	
45	Shutters	Automatic safety shutters	
46	Door Interlock	Mandatory	
47	LOTO Provision	Provided	
48	Cable Compartment	Rear access	
49	Pressure Relief	Provided for HV compartments	
50	Standards Compliance	IEC / IS / CEA Regulations	
51	SCADA Compatibility	Required	
52	Lifting Arrangement	Lifting hooks provided	
53	Painting	Powder coating / approved process	
54	Surface Treatment	7 tank / sand blasting	
55	Fire Safety	Designed to minimize fire risk	
56	Interchangeability	Parts interchangeable	
57	Packing	Suitable for transport & storage	
58	Inspection	Pre-dispatch inspection by purchaser	
59	Documentation	Drawings, SLD, GA, manuals required	
60	Name Plate	Engraved metal, full details	

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TECHNICAL SPECIFICATION NO - A03

2x 5 MVA POWER TRANSFORMERS

1.0 SCOPE:

The scope of this tender includes the design, manufacture, supply, erection, testing and commissioning by supplier/bidder at site. i.e. Moran Power Station for the purpose of grid connectivity at 33 KV of two (02) nos. of 5 MVA, 33/11 kV, Oil type, Outdoor transformer having facility for Nitrogen Injected Fire Protection System, SAS connectivity and Condition Monitoring for parallel operation along with supply of spares.

2.0 General Specification:

(a) This Specification provides for design, engineering, manufacture, assembly, stage inspection, final inspection and testing before dispatch, packing and delivery at destination Sub-station by transport, transit insurance, unloading at site /stores of two(02) nos. of 5 MVA, 33/11 KV Power Transformer(s) for continuous parallel operation, complete with all fittings, accessories, associated equipment's, spares, 10% extra Transformer Oil, required for its satisfactory operation in the sub- stations of the purchaser.

(b) The core shall be constructed either from high grade, non-aging Cold Rolled Grain Oriented (CRGO) silicon steel laminations conforming to HIB grade of BIS certified with lamination thickness not more than 0.23mm to 0.27mm or better (Quoted grade and type shall be used). The maximum flux density in any part of the cores and yoke at normal voltage and frequency shall be such that, at 12.5% overvoltage condition it should not be more than 1.9 Tesla. The supplier shall provide saturation curve of the core material, proposed to be used. Prior to inspection and testing of the transformer the supplier shall submit on request following curves of the core manufacturer:

i. Flux Density vs Core Loss. & ii. Flux Density vs Excitation.

(c) Laminations of different grade(s) and different thickness (s) are not allowed to be used in any manner or under any circumstances. The core shall have magnate coating as insulation. The assembled core shall be securely clamped on the limbs and yoke with uniform pressure so as to minimize noise emission from it. The insulation structure for the core to bolts and core to clamp plates shall be such as to withstand a voltage of 200V at 50Hz for 1min.

(d) The scope of supply includes the provision of type test. The equipment offered should have been successfully type tested within five years from date of tender and the designs should have been in satisfactory operation for a period not less than three years as on the date of order. Compliance shall be demonstrated by submitting, (i) authenticated copies of the type test reports and (ii) performance certificates from the users, specifically from Central Govt. /State Govt. or their undertakings. However, if it is found that the bidder has submitted type test reports but those have not been conducted on identical design of equipment/material as per APDCL specification, the same may be accepted

subjected to the following condition:

I) OIL at its discretion may request the successful bidder to conduct type test on the identical design as per APDCL specification.

II) Such type tests, if required to be carried out at CPRI/ERDA in presence of OIL Engineer for which no extra cost shall be charged to OIL.

3.0 SPECIFIC TECHNICAL REQUIREMENTS:

1	No of transformers	Two (02)
2	Rated MVA (ONAN rating)	5.0 MVA
3	No. of phases	3
4	Type of installation	Outdoor
5	Frequency	50 Hz (± 5 %)
6	Cooling medium	Insulating Oil
7	Type of Cooling	Oil Natural Air Natural (ONAN)
8	Type of mounting	On Wheels, Mounted on rails
9	High voltage winding	33 KV
10	Low voltage winding	11 KV
11	Maximum system voltage ratio (HV / LV)	36KV / 12 KV
12	Rated voltage ratio (HV / LV)	33KV /11 KV
13	Winding Material	Electrolytic Copper
14	High Voltage Winding	DELTA
15	Low Voltage Winding	STAR
16	Vector group reference	Dyn11
17	No. of windings	Two winding Transformers
18	Method of System Earthing	Resistance Grounding
19	Neutral terminal to be brought out	On LV side only
20	Core Material	CRGO
21	Core Assembly	Boltless type
22	Type of Tap Changer	Off-Load Tap Changer
23	Range of Tapping	+ 5% to – 15% in 17 equal steps of 1.25% each on HV winding
24	Intended regular cyclic overloading of windings	As per IEC –76-1, Clause 4.2 The Power transformer shall be suitable for operating under overload condition as specified in IS 6600 and a separate Over Loading chart should be submitted along with offer.
25	Anticipated unbalanced	Around 10%

	loading			
26	Anticipated continuous loading of windings (HV/LV)	110% of rated current		
27	Over Voltage operating capability and duration	112.5% of rated voltage		
28	Withstand time for three phase short circuit	2 seconds		
29	Maximum current density for HV and LV winding for rated current	2.4Amp/ Sq.mm. for copper conductor at any working tap including extreme tap 17 (-15% voltage).		
30	Magnetizing Current	1% of full load current.		
31	Maximum flux densityin any part of the core and yoke at rated MVA, rated voltage i.e 33kV / 11kV and system frequency of 50 Hz	1.55 Tesla		
32	Maximum Flux Density in any part of the core and yoke at 112.5 % of rated voltage i.e 33 KV /11 KV and system frequency of 50 HZ	1.9 Tesla		
	Insulation	33 kV	11 kV	
33	Type of Insulation	Uniform	Uniform	
34	One minute power frequency withstand Voltage(kV rms)	70	28	
35	1.2 / 50 microsecond wave shape Lighting Impulse withstand voltage (KVP)	170	75	
36	Nominal short circuit level (Basing on apparent power)	31.5KA	25KA	
37	Insulation level of bushing			
38	Lightning Impulse withstand (KVP)	170	75	
39	1 Minute Power Frequency withstand voltage (KV –rms)	70	28	
40	Minimum Clearnce in air (rms)	Ph-Ph	Ph-E	Ph-E (oil)
41	HV	400	320	40
42	LV	280	140	25
43	Creepage distance (mm) (minimum)	972	324	
44	Percentage impedance voltage on normal tap and MVA base at 75o C corresponding to HV/ LV rating and applicable tolerances:	MVA Rating	%Impedance	Tolerance %
		5	7.15	10

45	Permissible Temperature Rise over ambient temperature of 40 / 45˚C	
	Of top oil measured by thermometer	40˚C
	Of winding measured by resistance	45˚ C
46	Noise level at rated voltage and frequency	Transformers shall be designed with particular care to suppress at least the third and fifth harmonic voltages so as to minimize interference with communication circuits. Transformer noise level when energized at normal voltage and frequency shall be as per NEMA stipulations TR -1.
47	Terminal Details	
	HV winding line end	36 KV oil filled communicating type porcelain bushings (Anti-fog type)as per IS 3347 and IS2099 with their latest amendments thereof
	LV winding	17.5 KV porcelain type of bushing (Anti-fog type)as per IS 3347 and IS2099 with their latest amendments thereof
	33kV Termination	3C*300 Sq.mm XLPE cable
	11 KV Termination	3C * 240 sq.mm XLPE cable
48	Polarization index (HV to LV, HV to Earth & LV to earth)	IR Test = 10 minutes value / 1 minute value will not be more than 5 and less than 1.5
49	Temperature Indicator	
	Oil (SCADA compatible)	One number
	Winding (SCADA compatible)	One number
50	Type of mounting	On Wheels, Mounted on rails
51	Fire Protection System as per CEA	NIFPS
52	Condition Monitoring/Asset Monitoring	Yes

4.0 GENERAL CONSTRUCTIONAL FEATURES:

(a) All material used shall be of best quality and of the class most suitable for working under the conditions specified and shall withstand the variations of temperature and atmospheric conditions without distortion or deterioration or the setting up of undue stresses which may impair suitability of the various parts for the work which they have to perform.

(b) Similar parts particularly removable ones shall be interchangeable.

(c) Pipes and pipe fittings, screws, studs, nuts and bolts used for external connections shall be as per the relevant standards. Steel bolts and nuts exposed

to atmosphere shall be galvanized.

(d) Nuts, bolts and pins used inside the transformers and tap changer compartments shall be provided with lock washer or locknuts.

(e) Exposed parts shall not have pockets where water can collect.

(f) Internal design of transformer shall ensure that air is not trapped in any location.

(g) Material in contact with oil shall be such as not to contribute to the formation of acid in oil. Surface in contact with oil shall not be galvanized or cadmium plated.

(h) Labels, indelibly marked, shall be provided for all identifiable accessories like Relays, switches current transformers etc. All label plates shall be of in corrodible material.

(i) All internal connections and fastenings shall be capable of operating under overloads and over-excitation, allowed as per specified stands without injury.

(j) Transformer and accessories shall be designed to facilitate proper operation, inspection, maintenance and repairs.

(k) No patching, plugging, shimming or other such means of overcoming defects, discrepancies or errors will be accepted.

(l) Schematic Drawing of the wiring, including external cables shall be put under the prospane sheet on the inside door of the transformer marshalling box.

5.0 TANK:

(a) The Transformer tank and cover shall be fabricated from high grade low carbon plate steel of tested quality. The tank and the cover shall be of welded construction.

(b) Tank shall be designed to permit lifting by crane or jacks of the complete transformer assembly filed with oil. Suitable lugs and bossed shall be provided for this purpose.

(c) All breams, flanges, lifting lugs, braces and permanent parts attached to the tank shall be welded and where practicable, they shall be double welded.

(d) The main tank body of the transformer, excluding tap changing compartments and radiators, shall be capable of withstanding pressure of 760mm of Hg.

(e) Inspection hole(s) with welded flange(s) and bolted cover(s) shall be provided on the tank cover. The inspection hole(s) shall be of sufficient size to afford easy access to the lower ends of the bushings, terminals etc.

(f) Gaskets of nitrile rubber or equivalent shall be used to ensure perfect oil tightness. All gaskets shall be closed design (without open ends) and shall be of one piece only. Rubber gaskets used for flange type connections of the various oil compartments shall be laid in grooves or in groove-equivalent sections on bolt sides of the gasket, throughout their total length. Care shall be taken to secure uniformly distributed mechanical strength over the gaskets and retains throughout the total length. Gaskets of neoprene and / or any kind of impregnated / bonded core or cork only which can easily be damaged by over-pressing are not acceptable. Use of hemp as gasket material is also not acceptable.

(g) Suitable guides shall be provided for positioning the various parts during assemble or dismantling. Adequate space shall be provided between the cores and windings and the bottom of the tank for collection of any sediment.

(h) Tank Cover The transformer top shall be provided with a detachable tank cover with bolted flanged gasket joint. Lifting lugs shall be provided for removing the cover. The surface of the cover shall be suitable sloped so that it does not retain rain water.

(i) The power transformer shall be designed in a way for seamless integration of "Nitrogen Injected Fire Protection System" (NIFPS) at site. It shall be the responsibility of system integration (Bidder/Supplier) to ensure seamless integration of the both.

(j) The power transformer shall be designed in a way for seamless integration of "Condition Monitoring/Asset Monitoring" at site. It shall be the responsibility of system integration (Bidder/Supplier) to ensure seamless integration of the both.

6.0 UNDER CARRIAGE:

The transformer tank shall be supported on steel structure with detachable plain rollers completely filled with oil. Suitable channels for movement of roller with transformer shall be spaced accordingly, rollers wheels shall be provided with suitable rollers bearings, which will resist rust and corrosion and shall be equipped with fittings for lubrication. It shall be possible to swivel the wheels in two directions, at right angle to or parallel to the main axis of the transformers.

7.0 CORE:

(a) Each lamination shall be insulated such that it will not deteriorate due to mechanical pressure and the action of hot transformer oil.

(b) The core shall be constructed either from high grade, non-aging Cold Rolled Grain Oriented (CRGO) silicon steel laminations conforming to HIB or higher grade with lamination thickness not more than 0.23mm to 0.27mm or better(Quoted grade and type shall be used). The maximum flux density in any part of the cores and yoke at normal voltage and frequency shall not be more than 1.5 Tesla. The Bidder shall provide saturation curve of the core material, proposed

to be used. Laminations of different grade(s)_ and different thickness (s) are not allowed to be used in any manner or under any circumstances.

(c) The bidder should offer the core for inspection starting from the destination port to enable Employer for deputing inspecting officers for detail verification as given below and approval by the Employer during the manufacturing stage. Bidder's call notice for the purpose should be accompanied with the following documents as applicable as a proof towards use of prime core material: The core coils, if found suitable, are to be sealed with proper seals which shall be opened in presence of the inspecting officers during core- cutting at the manufacturer's or it's sub-vendor's premises as per approved design drawing:

i. Purchase Order No. & Date.
ii. Invoice of the supplier
iii. Mills test certificate
iv. Packing list
v. Bill of lading
vi. Bill of entry certificate to customs

(d) Core material shall be directly procured either from the manufacturer or through their accredited marketing organization of repute, but not through any agent.

(e) The laminations shall be free of all burrs and sharp projections. Each sheet shall have an insulting coating resistant to the action of hot oil.

(f) The insulation structure for the core to bolts and core to clamp plates, shall be such as to withstand 2000 V DC voltage for one minute.

(g) The completed core and coil shall be so assembled that the axis and the plane of the outer surface of the core assemble shall not deviate from the vertical plane by more than 25mm.

(h) All steel sections used for supporting the core shall be thoroughly shot or sand blasted, after cutting, drilling and welding.

(i) The finally assembled core with all the clamping structures shall be free from deformation and shall not vibrate during operation.

(j) The core clamping structure shall be designed to minimize eddy current loss.

(k) The framework and clamping arrangements shall be securely earthed.

(l) The core shall be carefully assembled and rigidly clamped to ensure adequate mechanical strength.

(m) Oil ducts shall be provided, where necessary, to ensure adequate cooling inside the core. The welding structure and major insulation shall not obstruct the free flow of oil through such ducts.

(n) The design of magnetic circuits shall be such as to avoid static discharges,

development of short circuit paths within itself or to the earth clamping structure and production of flux component at right angle to the plane of the lamination, which may cause local heating. The supporting framework of the cores shall be so designed as to avoid the presence of pockets, which would prevent complete emptying of the tank through the drain valve or cause trapping of air during filling.

(o) The construction is to be of boltless core type. The core shall be provided with lugs suitable for lifting the complete core and coil assembly. The core and coil assembly shall be so fixed in the tank that shifting will not occur during transport or short circuits.

(p) The temperature gradient between core & surrounding oil shall be maintained less than 20 deg. Centigrade. The manufacturer shall demonstrate this either through test (procurement to be mutually agreed) or by calculation.

8.0 WINDING:

(a) Winding shall be subjected to a shrinking and seasoning process, so that no further shrinkage occurs during service. Adjustable devices shall be provided for taking up possible shrinkage in service.

(b) All low voltage windings for use in the circular coil concentric winding shall be wound on a performed insulating cylinder for mechanical protection of the winding in handling and placing around the core.

(c) Winding shall not contain sharp bends which might damage the insulation or produce high dielectric stresses. No strip conductor wound on edge shall have width exceeding six times the thickness.

(d) Materials used in the insulation and assembly of the windings shall be insoluble, non catalytic and chemically inactive in the hot transformer oil and shall not soften or the otherwise affected under the operating conditions.

(e) Varnish application on coil windings may be given only for mechanical protection and not for improvement in dielectric properties. In no case varnish or other adhesive be used which will seal the coil and prevent evacuation of air and moisture and impregnation by oil.

(f) Winding and connections shall be braced to withstand shocks during transport or short circuit.

(g) Permanent current carrying joints in the windings and leads shall be welded or brazed. Clamping bolts for current carrying parts inside oil shall be made of oil resistant material which shall not be affected by acidity in the oil steel bolts, if used, shall be suitably treated.

(h) Terminals of all windings shall be brought out of the tank through bushings for external connections.

(i) The completed core and coil assemble shall be dried in vacuum at not more than 0.5mm of mercury absolute pressure and shall be immediately impregnated with oil after the drying process to ensure the elimination of air and moisture within the insulation. Vacuum may be applied in either vacuum over or in the transformer tank.

(j) The winding shall be so designed that all coil assembles of identical voltage ratings shall be interchangeable and field repairs to the winding can be made readily without special equipment. The coils shall have high dielectric strength.

(k) Coils shall be made of continuous smooth high grade electrolytic copper conductor, shaped and braced to provide for expansion and contraction due to temperature change

(l) Adequate barriers shall be provided between coils and core and between high and low voltage coil. End turn shall have additional protection against abnormal line disturbances.

(m) The insulation of winding shall be designed to withstand voltage stress arising from surge in transmission lines due to atmospheric or transient conditions caused by switching etc.

(n) Tapping shall not be brought out from inside the coil or from intermediate turns and shall be so arranged as to preserve as far as possible magnetic balance of transformer at all voltage ratios.

(o) Magnitude of impulse surges transferred from HV to LV windings by electromagnetic induction and capacitance coupling shall be limited to BILL of LV winding.

(p) 1.6.6.8 The current density adopted in all winding shall not exceed 2.4 A/mm2. The total net cross sectional area of the strip conductors for calculating current density for each winding shall be obtained after deducting the copper lost due to rounding up of the sharp edges at the rectangular conductors.

9.0 INSULATING OIL:

(a) The insulating oil for the transformer shall be of EHV grade, generally conforming to IS: 335. No inhibitors shall be used in the oil.

(b) The quantity of oil required for the first filling of the transformer and its full specification shall be stated in the bid. transformer shall supplied complete with all fittings, accessories and new transformer oil required for first filling plus 10% extra oil. The extra quantity of oil shall be supplied in non-returnable drums along with the oil required for the radiator banks.

(c) The design and materials used in the construction of the transformer shall be such as to reduce the risk of the development of acidity in the oil.

10.0 VALVES:

(a) Valves shall be of forged carbon steel upto 50mm size and of gun mental or of cast iron bodies with gun metal fittings for sizes above 50mm. They shall be of

full way type with screwed ends and shall be opened by turning counterclockwise when facing the hand wheel. There shall be no oil leakage when the valves are in closed position.

(b) Each valve shall be provided with an indicator to show the open and closed positions and shall be provided with facility for padlocking in either open or closed position. All screwed valves shall be furnished with pipe plugs for protection. Padlocks with duplicate keys shall be supplied along with the valves.

(c) All valves except screwed valves shall be provided with flanges having machined faced drilled to suit the applicable requirements, Oil tight blanking plates shall be provided for each connection for use when any radiator is detached and for all valves opening to atmosphere. If any special radiator valve tools are required the contractor shall supply the same.

(d) Each transformer shall be provided with the following valves on the tank:

i. Drain valve so located as to completely drain the tank & to be provided with locking arrangement.
ii. Two filter valves on diagonally opposite corners of 50mm size & to be provided with locking arrangement.
iii. Oil sampling valves not less than 8mm at top and bottom of main tank & to be provided with locking arrangement.
iv. One 15mm air release plug. e) Valves between radiators and tank. Drain and filter valves shall be suitable for applying vacuum as specified in the specifications.

11.0 MARSHALLING BOX:

a) Sheet steel, weather, vermin and dust proof marshalling box fitted with required glands, locks, glass door, terminal Board, heater with switch, illumination lamp with switch, water- tight hinged and padlocked door of a suitable construction shall be provided with each transformer to accommodate temperature indicators, terminal blocks etc. The box shall have slopping roof and the interior and exterior painting shall be in accordance with the specification. Padlock along with duplicate keys shall be supplied for marshalling box. The degree of protection shall be IP-55 or better.

b) The schematic diagram of the circuitry inside the marshalling box be prepared and fixed inside the door under a prospone sheet.

c) The marshalling box shall accommodate the following equipment:

- Temperature indicators.
- Space for accommodating Control & Protection equipment in future for the cooling fan (for ONAF type cooling, may be provided in future).
- Terminal blocks and gland plate for incoming and outgoing cables.

All the above equipment except (iii) shall be mounted on panels and back of panel wiring shall be used for inter-connection. The temperature indicators shall be so mounted that the dials are not more than 1600 mm from the ground level

and the door (s) of the compartment(s) shall be provided with glazed window of adequate size. The transformer shall be erected on a plinth which shall be 2.5 feet above ground level.

d) To prevent internal condensation, a metal clad heater with thermostat shall be provided. The heater shall be controlled by a MCB of suitable rating mounted in the box. The ventilation louvers, suitably padded with felt, shall also be provided. The louvers shall be provided with suitable felt pads to prevent ingress of dust.

e) All incoming cables shall enter the kiosk from the bottom and the gland plate shall not be less than 450 mm from the base of the box. The gland plate and associated compartment shall be sealed in suitable manner to prevent the ingress of moisture from the cable trench.

12.0 TERMINALS:

a) The 33/11 kV power transformer shall be provided with suitable terminations for connection of power cables on both voltage sides. On the 33 kV side, the transformer shall be equipped with outdoor grade porcelain/composite bushings of 36 kV class, suitable for termination of 3-core 300 sq.mm XLPE power cables, complete with terminal connectors, phase identification and adequate creepage distance for outdoor service.

b) On the 11 kV side, the transformer shall be provided with a weather-proof, metallic cable termination box mounted on the transformer tank, suitable for termination of 3-core 240 sq.mm XLPE power cables. The LV cable box shall have bottom cable entry with removable gland plates, adequate internal clearances, cable support and earthing facilities.

c) Provision shall be made inside the 11 kV cable box for termination and grounding of the neutral point, including a suitably rated neutral terminal and removable copper link for connection to the neutral grounding resistor(NGR). All cable screens and armours shall be solidly earthed at the transformer end. Terminations shall be suitable for 50 Hz operation and comply with relevant IS/IEC standards.

13.0 TAPCHANGER:

The 33/11 kV, 5 MVA oil-filled power transformer shall be provided with a three-phase, off-load tap changer (OLTC-OFF / OCTC) mounted inside the transformer tank and immersed in transformer oil. The tap changer shall be designed for operation only when the transformer is de-energized and shall be suitable for making and carrying the full rated current of the transformer at all tap positions. The tapping shall be provided on the high-voltage winding with a tapping range of +5% to –15% in steps of 1.25%, or as specified elsewhere, while maintaining magnetic balance and rated insulation levels. The tap changer shall be of robust, proven design, with positive indexing, self-positioning contacts, and high-conductivity contact material suitable for long service life in oil. The operating mechanism shall be manual, pad-lockable, and brought out to the transformer exterior with a clear tap position indicator visible from ground level. The tap changer

shall be capable of withstanding the thermal and mechanical stresses arising from rated load, short-circuit conditions, and over-excitation, and shall conform to the requirements of IS 2026 / IEC 60076 and relevant standards.

14.0 PAINTING

a) All paints shall be applied in accordance with the paint manufacturer‘s recommendations. Particular attention shall be paid to the following:

I) Proper storage to avoid exposure as well as extremes of temperature.
II) Surface preparation prior to painting.
III) Mixing and thinning
IV) Application of paints and the recommended limit on time intervals between coats.
V) Shelf life for storage.

b) All paints, when applied in normal full coat, shall be free from runs, sags, wrinkles, patchiness, brush marks or other defects.

c) All primers shall be well marked into the surface, particularly in areas where painting is evident, and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray according to the manufacturer‘s recommendations. However, wherever airless spray is not possible, conventional spray be used with prior approval of Employer.

d) The supplier shall, prior to painting protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

e) Cleaning and surface preparation.

I) After all machining, forming and welding has been completed, all steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination prior to any painting.
II) Steel surfaces shall be prepared by Sand/Shot blast cleaning or chemical cleaning by seven tank process including Phosphate to the appropriate quality.
III) The pressure and Volume of the compressed air supply for the blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination prior to any painting.
IV) Chipping, scraping and steel wire brushing using manual or power-driven tools cannot remove firmly adherent mill-scale and shall only be used where blast cleaning is impractical.
V) Protective Coating As soon as all items have been cleaned and within four hours of the subsequent drying, they shall be given suitable anticorrosion protection.

f) Paint Material: The following are the type of paints that may be suitably used for the items to be painted at shop and supply of matching paint to site:
   i. Heat resistant paint (Hot oil proof) for inside surface.

ii. For external surfaces one coat of Thermo Setting Paint or 2 coats of Zinc chromate followed by 2 coats of POLYURETHANE.

g) Painting Procedure

I) All painting shall be carried out in conformity with both specifications a nd with the paint manufacture's recommendations. All paints in any one particular system. Whether shop or site applied, shall originate from one paint manufacturer.

II) Particular attention shall be paid to the manufacturer's instructions on storage, mixing, thinning and pot life. Thepaint shall only be applied in the manner detailed by the manufacturer e.g. brush, roller, conventional or airless spray and shall be applied under the manufacturer's recommended conditions. Minimum and maximum time intervals between coats shall be closely followed.

III) All prepared steel surfaces should be primed before visible re-rusting occurs or within 4 hours whichever is sooner. Chemical treated steel surfaces shall be primed as soon as the surface is dry and while the surface is warm.

IV) Where the quality of film is impaired by excess film thickness,(wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coatings and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances, where two or more coats of the same paints are specifies, such coatings may or may not be of contrasting colors.

V) Paint applied to items that are not to be painted, shall be removed at supplier's expense, leaving the surface clean, un-stained and undamaged.

h) Damages to Paints Work

I) Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.

II) Any damaged paint work shall be made as follows:

a. The damaged area, together with an area extending 25mm around its boundary, shall be cleaned down to bare metal.
b. A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50mm around the perimeter of the originally damaged.

III) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.

i) Dry Film Thickness

I) To the maximum extent practicable, the coats shall be applied as a continuous film of uniform thickness and free of pores. Over-spray, skips, runs, sags and drips should be avoided. The different coats may or may not be same color.

II) Each coat of paint shall allowed to hardened before the next is applied as per manufacturer's recommendations. 6.23.8.3 Particular attention must be paid to full film thickness at edges.

15.0 LOSSES: - The losses shall not exceed the value given below

MVA rating	No load loss(Fixed Loss)(Kw)	Load Losses at 75 C	% Impedance
5	4	21	7.15

The above-mentioned losses are maximum permissible and there shall not be any plus tolerance above this limit. In case during testing, the actual losses are found within guaranteed figure, the transformers shall be accepted without any advantage to the bidder for lower losses. Measurement of losses shall form part of type test/routine test The purchaser reserves the right to reject the transformers if on testing, the losses exceed the declared losses or the temperature rise in oil and/or winding exceeds the value guaranteed in technical particular or impedance value differ from the guaranteed value and if any test results do not match with the values given in the guaranteed technical particulars and as per technical specification.

16.0 PERFORMANCE:

a) Transformer shall be capable of withstanding for two seconds without damage to any external short circuit, with the short circuit MVA available at the terminals.

b) The maximum flux density in any part of the core and yoke at rated MVA, Voltage and frequency shall be1.55 Tesla (maximum).

c) Transformer shall under exceptional circumstances due to sudden disconnection of the load, be capable of operating at the voltage approximately 25% above normal rated voltage for a period of not exceeding one minute and 40% above normal for a period of 5 seconds.

d) The transformer may be operated continuously without danger on any particular tapping at the rated MVA± 1.25% of the voltage corresponding to the tapping.

e) The thermal ability to withstand short circuit shall be demonstrated by calculation.

f) Transformer shall be capable of withstanding thermal and mechanical stress caused by any symmetrical and asymmetrical faults on any winding. This shall be demonstrated through calculation as per IS: 2026

g) The transformer shall be capable of being operated without danger on any tapping at the rated KVA with voltage variations and ± 10% corresponding to the voltage of the tapping.

17.0 TOLERANCE: The tolerance of guaranteed performance figures shall be as specified in the latest issue of IS 2026 or relevant International Standard except wherever specified otherwise in this specification.

18.0 CONTROL CONNECTIONS AND INSTRUMENT AND WIRING TERMINAL BOARD AND FUSES:

a) Normally no fuses shall be used anywhere. Instead of fuses MCB"s (both in AC & DC circuits) shall be used. Only in cases where a MCB cannot placed due to system requirements, a HRC fuse can be accepted.

b) All wiring connections, terminal boards, fuses MC's and links shall be suitable for tropical atmosphere. Any wiring liable to be in contact with oil shall have oil resisting insulation and the bare ends of stranded wire shall be sweated together to prevent seepage of oil along the wire.

c) Panel connections shall be neatly and squarely fixed to the panel. All instruments and panel wiring shall be run in PVC or non-rusting metal cleats of the compression type. All wiring to a panel shall be taken from suitable terminal boards.

d) Where conduits are used, the runs shall be laid with suitable falls, and the lowest parts of the run shall be external to the boxes. All conduit runs shall be adequately drained and ventilated. Conduits shall not be run at or below ground level. When 400 volt connections are taken through junction boxes or marshalling boxes, they shall be adequately screened and 400 volts Danger Notice must be affixed to the outside of the junction boxes or marshalling box. Proper colour code for Red, Yellow, Blue wires shall be followed.

e) All box wiring shall be in accordance with relevant ISS. All wiring shall be of stranded copper (48 strands) of 1100 Volt grade and size not less than 2.5 sq.mm.

f) All wires on panels and all multi-core cables shall have ferrules, for easy identifications, which bear the same number at both ends, as indicated in the relevant drawing.

g) At those points of interconnection between the wiring carried out by separate contractors, where a change of number cannot be avoided double ferrules shall be provided on each wire. The change of numbering shall be shown on the

appropriate diagram of the equipment.

h) The same ferrule number shall not be used on wires in different circuits on the same panels.

i) Ferrules shall be of white insulating material and shall be provided with glossy finish to prevent the adhesion of dirt. They shall be clearly and durably marked in black and shall not be affected by dampness or oil.

j) Stranded wires shall be terminated with tinned Ross Courtney terminals, claw washers or crimped tubular lugs. Separate washers shall be suited to the size of the wire terminated. Wiring shall, in general, be accommodated on the sides of the box and the wires for each circuit shall be separately grouped. Back of panel wiring shall be arranged so that access to the connecting items of relays and other apparatus is not impeded.

k) All circuits in which the voltage exceeds 125 volts, shall be kept physically separated from the remaining wiring. The function of each circuit shall be marked on the associated terminal boards.

l) Where apparatus is mounted on panels, all metal cases shall be separately earthed by means of stranded (48 No.) copper wire of strip having a cross section of not less than 2 sq. mm where strip is used, the joints shall be sweated. The copper wire shall have green coloured insulation for earth connections.

m) All wiring diagram for control and relay panel shall preferably be drawn as viewed from the back and shall show the terminal boards arranged as in services.

n) Terminal block rows should be spaced adequately not less than 100 mm apart to permit convenient access to external cables and terminations.

o) Terminal blocks shall be placed with respect to the cable gland (at a minimum distance of 200 mm) as to permit satisfactory arrangement of multicore cable tails. xvii) Terminal blocks shall have pairs of terminals for incoming and outgoing wires. Insulating barriers shall be provided between adjacent connections. The height of the barriers and the spacing between terminals shall be such as to give adequate protection while allowing easy access to terminals. The terminals shall be adequately protected with insulating dust proof covers. No live metal shall be exposed at the back of the terminal boards. CT terminals shall have shorting facilities. The terminals for CTs should have provision to insert banana plugs and with isolating links.

p) All interconnecting wiring, as per the final approved scheme between accessories of transformer and marshalling box is included in the scope of this specification and shall be done by the Transformer supplier.

q) The schematic diagram shall be drawn and fixed under a transparent propane sheet on the inner side of the marshalling box cover.

r) To avoid condensation in the Marshalling Box, a space heater shall be provided with an MCB and thermostat.

s) Suitable MV, CFL light shall be provided in the Marshalling Box for lightning purpose.

19.0 BUSHING:

a) All porcelain used in bushings shall be homogeneous, non-porous, uniformly glazed to brown colour and free from blisters, burns and other defects.

b) Stress due to expansion and contraction in any part of the bushing shall not lead to deterioration.

c) Bushing shall be designed and tested to comply with the applicable standards.

d) Bushing rated for 630 A and above shall have non-ferrous flanges and hardware.

e) Fittings made of steel or malleable iron shall be galvanized

f) Bushing shall be so located on the transformers that full flashover strength will be utilized. Minimum clearances as required for the BIL shall be realized between live parts and live parts to earthed structures.

g) All applicable routine and type tests certificates of the bushings shall be furnished for approval.

h) Bushing shall be supplied with bi-metallic terminal connector/ clamp/ washers suitable for fixing to bushing terminal and the Employers specified conductors. The connector/clamp shall be rated to carry the bushing rated current without exceeding a temperature rise of 550 C over an ambient of 45 deg C. The connector/clamp shall be designed to be corona free at the maximum rated line to ground voltage.

i) Bushing of identical voltage rating shall be interchangeable.

j) The insulation class of high voltage neutral bushing shall be properly coordinated with the insulation class of the neutral of the low voltage winding.

k) Each bushing shall be so coordinated with the transformer insulation that all flashover will occur outside the tank.

l) The extended bushing bus bars shall be used for termination of 11 KV cables. LV busing shall be housed in completely sealed metallic enclosure.

m) Sheet steel, weather, vermin and dust proof cable box fitted with required glands, locks, glass door, terminal Board, heater with switch, illumination lamp with switch, watertight hinged and padlocked door of a suitable construction shall be provided with each transformer to accommodate 11 KV cables etc. The

box shall have slopping roof and the interior and exterior painting shall be in accordance with the specification. Padlock along with duplicate keys shall be supplied for marshalling box. The degree of protection shall be IP-55 or better.Toprevent internal condensation, a metal clad heater with thermostat shall be provided. The heater shall be controlled by a MCB of suitable rating mounted in the box. The ventilation louvers, suitably padded with felt, shall also be provided. The louvers shall be provided with suitable felt pads to prevent ingress of dust.All incoming cables shall enter the kiosk from the bottom and the minimum 4mm thick, non-magnetic, gland plate shall not be less than 600 mm from the base of the box. The gland plate and associated compartment shall be sealed in suitable manner to prevent the ingress of moisture from the cable trench.

20.0 PROTECTION & MEASURING DEVICES:

a) Oil Conservator Tank:

I. The Conservator tank shall have adequate capacity between highest and lowest visible levels to meet the requirement of expansion of the total cold oil volume in the transformer and cooling equipment.

II. The conservator tank shall be bolted into position so that it can be removed for cleaning purposes.

III. The conservator shall be fitted with magnetic oil level gauge with low level electrically insulated alarm contact.

IV. The conservator should be provided with an air cell/ flexi separator to prevent direct contact of transformer oil with atmospheric air for retarding oxidation or contamination of oil. The Air cell shall be made from suitable material with inner coating resistant to transformer oil & outer coating resistant to ozone & weathering. e) All breathers shall be mounted at approximately 1400 mm above ground level and shall be connected to the air cell of the conservator through pipe for the purpose of breathing during contraction or expansion of the air cell.

b) Pressure Relief Device:
The pressure relief device provided shall be of sufficient size for rapid release of any pressure that may be generated in the tank and which may result in damage of the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure of transformer tank. It shall be mounted direct on the tank. A pair of electrically insulated contract shall be provided for alarm and tripping.

c) Buchholz Relay:

A double float type Buchholz relay shall be provided., Any gas evolved in the transformer shall collect in this relay. The relay shall be provided with a test cock suitable for a flexible pipe connection for checking its operation. A copper tube shall be connected from the gas collector to a valve located about 1200 mm above ground level to facilitate sampling with the transformer in service. The device shall

be provided with two electrically independent potential free contracts, one for alarm on gas accumulation and the other for tripping on sudden rise of pressure.

d) Temperature Indicator:

a) OTI and WTI shall be a compact system where both local and remote instrument are integrated and supplied as Hybrid Instrument and a self-powered local indication with switch controls and an externally powered remote indication for SCADA purposes.

b) Both the OTI and WTI should have remote reading capability compatible to be connected to SCADA system.

c) It should have no change in overall dimension of OTI and WTI and no additional Thermometer pockets are required.

d) OTI/ WTI shall have embedded PT-100 sensors in the sensing bulb of the local OTI/ WTI and Current Converter Unit (CCU) shall be mounted inside the Local OTI/WTI. The output from which can be connected to remote indicator or SCADA to provide a standard single or dual 4-20mA DC current output corresponding to measured temperature.

e) The WTI instruments shall have a built in Thermal imaging system for transformer's hot spot indication and shall be provided with gradient adjustment through a shunt for CT 5A secondary input. For the WTIs additional Winding temperature simulator should be provided.

f) Remote indicator for both OTI and WTI shall be digital type with minimum 4 digits LED display and resolution shall be within limit of O.10C. Remote indicators should have minimum 2 sets of 4 - 20mA DC output (Optional RS 485) for SCADA connection. g) Oil temperature indicator and winding temperature indicator with two electrical contacts for alarm and trip purposes and repeater for remote indication shall be provided with anti-vibration mounting. All switch contacts are potential free micro switches. The oil temperature indicator shall be housed in the existing marshalling box.

h) The oil and winding temperature indicator should be of 'Pecimeasure' or 'Perfect Control' only. The scale on the dial of the thermometer should be 0-150°C. The angular displacement of thermometer should be 270°. The signaling contact of WTI & OTI shall be set to operate at the following temperature:

i) OIL : Alarm-85 deg. C, Trip – 95 deg. C
ii) WINDING : Alarm-100 deg. C, Trip – 110 deg. C

i) The tripping contacts of indicator shall be adjustable to close the winding temperature indicator between 60°C and 120°C. The alarm contacts of indicator shall be adjustable to close between 50°C and 100°C. All contacts shall be adjustable on a scale and shall be accessible on removal of the cover. The temperature indicators shall be so designed that it shall be possible to check the operation of contacts and associated equipment.

j) Accuracy class of both OTI and WTI shall be ±1% or better and weatherproof

Protective Class IP-55.

21.0 THERMO-SIPHON FILTER ARRANGEMENT

Thermo-siphon filter arrangement shall be provided with the transformer for preserving the quality of transformer oil. Suitable instructions required to be followed for commissioning, dismantling and maintenance of the filter arrangement, re-generation and storage of the absorbent etc, must be included in the instruction manual. A detailed drawing showing internal arrangement of the filter shall also be submitted.

22.0 Provision of Current Transformer in L.V. side of Power Transformer:

In order to achieve Restricted Earth fault in star connected L.V. Side of Power Transformer, current transformer having following particulars shall have to be provided in the bushing turret of r, y & b phases and neutral of LV side of 5 & 10 MVA power transformer.

CT Particular	5 MVA Transformer
Type	Suitable for installation in L.V. side of Power Transformer for REF protection
Ratio	300/1A at all phases and Neutral
Accuracy Class	PS
Knee Point Voltage Vk	>250 V
RCT at 75 Deg. C at Lower & Higher Taps.	RCT <4 ohm at 750 Deg.C
Magnetising current at knee point voltage	< 30 mA at VK

23.0 Oil Preservation Equipment: Oil Sealing:

i) The oil preservation shall be diaphragm type oil sealing in conservator to prevent oxidation and contamination of oil due to contact with atmospheric moisture.
ii) The conservator shall be fitted with a dehydrating electronic breather. It shall be so designed that.
iii) Passage of air is through a dust filter & Silica gel.
iv) Silica gel is isolate from atmosphere by an oil seal.
v) Moisture absorption indicated by a change in colour of the crystals of the silica gel can be easily observed from a distance.
vi) Breather is mounted not more than 1400 mm above rail top level.

24.0 RADIO INTERFERENCE AND NOISE LEVEL

Transformers shall be designed with particular care to suppress at least the third and fifth harmonic voltages so as to minimize interference with communication circuits. Transformer noise level when energized at normal voltage and frequency shall be as per NEMA stipulations.

25.0 FITTINGS AND ACCESSORIES:

The following fittings and accessories shall be provided on the transformers:

a) Conservator with isolating valves, oil filling hole with cap and drain valve. The conservator vessel shall be filled with constant oil pressure diaphragm oil sealing system.

b) Magnetic type oil level gauge (150 mm dia) with low oil level alarm contacts.

c) Prismatic/ toughened glass oil level gauge.

d) Silica gel breather with oil seal and connecting pipe complete with first fill of activated silica gel or Alumina mounted at a level of 1300 mm above ground level.

e) a double float type Buchholz relay with isolating valve. Bleeding pipe and a testing cock, the test cock shall be suitable for a flexible (pipe connection for checking its operation). A 5mm dia. Copper pipe shall be connected from the relay test cock to valve located at a suitable height above ground level to facilitate sampling of gas with the transformer in service. Interconnection between gas collection box and relay shall also be provided. The device shall be provided with two electrically independent ungrounded contacts, one for alarm on gas accumulation and the other for tripping on sudden oil surge. These contacts shall be wired upto transformer marshalling box. The relay shall be provided with shut off valve on the conservator side as well as on the tank side.

f) Pressure relief devices (including pressure relief valve) and necessary air equalizer connection between this and the conservator with necessary alarm and trip contacts.

g) Air release plugs in the top cover.

h) Inspection cover, access holes with bolted covers for access to inner ends of bushing etc.

i) Winding temperature (hot spot) indicating device for local mounting complete in all respects. Winding temperature indicator shall have two set of contacts to operate at different settings: 1. To provide winding temperature high alarm 2. To provide a high trip.

j) Dial thermometer with pocket for oil temperature indicator with one set of alarm and one set of trip contacts and maximum reading pointer.

k) Lifting eyes or lugs for the top cover, core and coils and for the complete transformer.

l) Jacking pads.

m) Haulage lugs.

n) Protected type mercury / alcohol in glass thermometer and a pocket to house the same.

o) Top and bottom filter valves on diagonally opposite ends with pad locking arrangement on both valves.

p) Top and bottom sampling valves. xvii) Drain valve with pad locking arrangement.

q) Rating and connection diagram plate.

r) Two numbers tank earthing terminals with associated nuts and bolts for connections to Employer's grounding strip. Bi-directional flagged rollers with locking and bolting device.

s) Marshalling Box (MB).

t) Shut off valve on both sides of flexible pipe connections between radiator bank

and transformer tank.

u) Cooling Accessories :
   a. Requisite number of radiators provided with:- -
   b. One shut off valve on top
   c. One shut off valve at bottom
   d. Air release device on top
   e. Drain and sampling device at bottom
   f. Lifting lugs.
   g. Air release device and oil drain plug on oil pipe connectors

v) Terminal marking plates for Current Transformer and Main Transformer.

w) Oil Preservation Equipment

x) Oil Temperature indicator

y) Transformer shall be supplied with all control cable, SCADA compatible WTI& OTI, sensing cable, glands, lugs etc. (complete control).

z) Thermo siphon filter arrangement

aa) Conservator Air cell/flexi separator

Note: a) The fittings listed above are indicative and any other fittings which are generally required for satisfactory operation of the transformer are deemed to be included in the quoted price of the transformer.

b) The contacts of various devices required for alarm and trip shall be potential free and shall be adequately rated for continuous, making and breaking current duties as specified.

26.0 MISCELLANEOUS:

Padlocks along with duplicate keys as asked for various valves, marshalling box etc. shall be supplied by the contractor, wherever locking arrangement is provided. Foundation bolts for wheel locking devices of Transformer shall be supplied by the Contractor.

27.0 NAME PLATE:

Transformer rating plate shall contain the information as given in clause 15 of IS-2026 (part-I). The details on rating plate shall be finalized during the detailed engineering. Further, each transformer shall have inscription of Employer's name. The name plate shall also include

(i) Purchase Order No
(ii) Make, Year of Manufacturing
(iii) % impedance at principal tap position
(iv) The short circuit rating ,
(v) Measured no load current and no load losses at rated voltage and rated frequency,
(vi) Measured load losses at 75° C (normal tap only),
(vii) D.C resistance of each winding at 75° C.

28.0 DRAWINGS/ DOCUMENTS INCORPORATING THE FOLLOWING PARTICULARS SHALL BE SUBMITTED WITH THE BID:

(a) General outline drawing showing shipping dimensions and overall dimensions, net weights and shipping weights, quality of insulating oil, spacing of

wheels in either direction of motion, location of coolers, marshalling box and tap changers etc.

(b) Assembly drawings of core, windings etc. and weights of main components / parts.

(c) Height of center line on HV and LV connectors of transformers from the rail top level.

(d) Dimensions of the largest part to be transported.

(e) GA drawings / details of various types of bushing

(f) Tap changing and Name Plate diagram

(g) Type test certificates of similar transformers.

(h) Illustrative & descriptive literature of the Transformer.

(i) Maintenance and Operating Instructions.

29.0 Instruction Manual:

Three(03) sets of Instruction manuals shall be supplied. The manuals shall be in bound volumes and shall contain all the drawings and information required for erection, operation and maintenance of the transformer. The manuals shall include amongst other, the following particular:

a) Marked erection prints identifying the components, parts of the transformer as dispatched with assembly drawings.

b) Detailed dimensions, assembly and description of all auxiliaries.

c) Detailed views of the core and winding assembly, winding connections and tapings tap changer construction etc. These drawings are required for carrying out overhauling operation at site.

d) Salient technical particulars of the transformer.

e) Copies of all final approved drawings.

f) Detailed O&M instructions with periodical check lists and Performa etc.

30.0 Completeness of Equipment:

All fittings and accessories, which may not be specifically mentioned in the specification but which are necessary for the satisfactory operation of the transformer, shall be deemed to be included in the specification and shall be furnished by the supplier without extra charges. The equipment shall be complete in all details whether such details are mentioned in the specification or not, without any financial liability to the Employer under any circumstances

31.0 Completeness of Equipment:

All fittings and accessories, which may not be specifically mentioned in the specification but which are necessary for the satisfactory operation of the transformer, shall be deemed to be included in the specification and shall be furnished by the supplier without extra charges. The equipment shall be complete in all details whether such details are mentioned in the specification or not, without any financial liability to the Employer under any circumstances.

32.0 Tools & tackles:

All the necessary tools and tackles required for normal operation & maintenance of the transformers shall be supplied by the Contractor.

33.0 Inspection

Contactor shall inform OIL for inspection minimum 15 days prior to actual date of inspection of the finished product at OEM's workshop.Dispatch clearance will be issued only after approval of OIL's representative.During inspection minimum following, but not limited to, will be inspected:

(i) Tank and Conservator:

(a) Inspection of major weld.

(b) Crack detection of major strength weld seams by dye penetration test.

(c) Check correct dimensions between wheels, demonstrate turning of wheelsand further dimensional check.

(d) Leakage test of the conservator.

(ii) Core

(a) Sample testing of core materials for checking specific loss, properties, magnetization characteristics and thickness.

(b) Check on the quality of varnish if used on the stampings.

(c) Check on the amount of burrs.

(d) Visual and dimensional check during assembly stage.

(e) Check on completed core for measurement of iron loss, determination of maximum flux density,

(f) Visual and dimensional checks for straightness and roundness of core, thickness of limbs and suitability of clamps.

(g) High voltage DC test (2 KV for one minute) between core and clamps.

(iii) Insulating Material

(a) Sample check for physical properties of materials.

(b) Check for dielectric strength

(c) Check for the reaction of hot oil on insulating materials.

(iv) Winding

(a) Sample check on winding conductor for mechanical and electrical conductivity.

(b) Visual and dimensional checks on conductor for scratches, dent mark etc.

(c) Sample check on insulating paper for PH value, electric strength.

(d) Check for the bonding of the insulating paper with conductor.

(e) Check and ensure that physical condition of all materials taken for windings is satisfactory and free of dust.

(f) Check for absence of short circuit between parallel strands.

(v) Checks Before Drying Process

(a) Check condition of insulation on the conductor and between the windings.

(b) Check insulation distance between high voltage connections, between high voltage connection cables and earth and other live parts.

(c) Check insulating distances between low voltage connections and earth and other parts.

(d) Insulating test for core earthing.

(vi) Check During Drying Process

(a) Measurement and recording of temperature and drying time during vacuum treatment.

(b) Check for completeness of drying.

(vii) Assembled Transformer

(a) Check completed transformer against approved outline drawing, provision for all fittings, finish level etc.

(b) Jacking test on the assembled Transformer.

(viii) Oil: All standard tests in accordance with IS: 335 shall be carried out on Transformer oil sample before filling in the transformer.

(ix) Test Report for bought out items

(a) The contractor shall submit the test reports for all bought out / sub contracted items for approval.

i. Buchholz relay

ii. Sudden pressure rise relay on Main Tank

iii. Winding temperature indicators

iv. Oil temperature indicators

v. Bushings

vi. Bushing current transformers in all phases and neutral

vii. Marshalling box

viii. Off Load Tap changer

ix. Any other item required to complete the works.

x. Porcelain, bushings, bushing current transformers, wherever provided, winding coolers, control devices, insulating oil and other associated equipment shall be tested by the contractor in accordance with relevant IS . If such requirement is purchased by the contractor on a sub-contract, he shall have them tested to comply with these requirements.

(x) Thermo siphon filter arrangement

i. Conservator Aircell/flexiseparator

34.0 TESTS:

(A) FACTORY TESTS

i) All standard routine tests in accordance IS: 2026 with dielectric tests corresponding to latest amendments of IS: 2026 shall be carried out.

ii) All auxiliary equipment shall be tested as per the relevant IS. Test certificates shall be submitted for bought out items.

iii) High voltage withstand test shall be performed on auxiliary equipment and wiring after complete assembly.

iv) Following additional routine tests shall also be carried out on each transformer:

a) Magnetic Circuit Test on each core shall be tested for 1 minute at 2000 Volt DC

b) Oil leakage test on transformer.

(B) TYPE TEST

The measurements and tests should be carried out in accordance with the standard specified in each case as indicated in the following table if the same tests were not conducted earlier at CPRI or any NABL accredited Laboratory /ILAC i.e. International Laboratory Accreditation Corporationon the transformers of the offered design without any cost implication to employer.

(I) Temperature Rise Test

(II) Impulse Voltage Withstand Test, including Full Waves and Chopped Waves as listed below

(III) Noise Level Measurement

IV) Short Circuit Test

In accordance with IEC 76-3 the following sequence of impulses should have been/ should be applied;

(a) One full wave at 50% BIL;

(b) One full wave at 100% BIL;

(c) One chopped wave at 50% BIL

(d) Two chopped waves at 100% BIL and

(e) Two full waves at 100% BIL.

If the type test report(s) submitted by the bidder do not fulfil the criteria, astipulated in this technical specification, the relevant type test(s) has/ have to be conducted by the Bidder at his own cost in CPRI/ NABL accredited laboratory/ILAC i.e. International Laboratory Accreditation Corporation (in case of foreign laboratory)in the presence of employers representative(s) without any financial liability to employer in the event of order placed on him/her.

The offered transformer must be manufactured as per type tested design. A copy of type test certificate must be submitted by manufacturer to Engineer/Employer. Transformers offered without type tested design shall not be accepted. In case manufacturer agrees for type testing of transformers, testing shall be conducted on manufacturer's cost. No claim shall be acceptable towards type testing. The transformers shall be accepted only on acceptance of type testing results by employer.

The supplier shall furnish calculations in accordance with IS: 2026 to demonstrate the Thermal ability of the transformers to withstand Short Circuit forces.

(C) ROUTINE TESTS

Transformer routine tests shall include tests stated in latest issue of IS: 2026 (Part –1). These tests shall also include but shall not be limited to the following

a) Measurement of winding DC resistance.

b) Voltage ratio on each tapping and check of voltage vector relationship.

c) Impedance voltage at all tappings.

d) Magnetic circuit test as per relevant ISS or CBIP manual or latest standard being followed.

e) Measurement of Load losses at normal tap and extreme taps.

f) No load losses and no load current at rated voltage and rated frequency, also at 25% to 120 % of rated voltage in steps.

g) Absorption index i.e. Insulation resistance for 15 seconds and 60 seconds (R 60/ R 15) and polarization index i.e Insulation Resistance for 10 minutes and 1 minute (R 10 mt / R 1 mt).

h) Induced over voltage withstand test.

i) Separate source voltage withstand test.

j) Tan delta measurement and capacitance of each winding to earth (with all other windings earthed) & between all windings connected together to earth.

k) Measurement of zero sequence impedance.

l) Auxiliary circuit tests.

n) Oil BDV tests.

o) Measurement of neutral unbalance current which shall not exceed 2% of the full rated current of the transformer.

p) Magnetic balance test.

q) Leakage test. Six (6) set of certified test reports and oscillographs shall be submitted for evaluation prior to dispatch of the equipment. The contractor shall also evaluate the test results and shall correct any defect indicated by his and Employers evaluation of the tests without charge to the Employer.

(D) Pre-Commissioning Tests

After the transformer is installed, the following pre-commissioning tests and checks shall be done before putting the transformer in service.

i) Dry out test

ii) Insulation Resistance Test

iii) DC Resistance measurement of windings

iv) Ratio test on all taps

v) Phase relationship test (Vector grouping test)

vi) Buchholz relay alarm & surge operation test

vii) Low oil level (in conservator) alarm

viii) Temperature Indicators

ix) Marshalling kiosk

x) Protective relays

xi) Magnetising current

xii) Tests on Off load tap changer

35.0 MISCELLANEOUS

a) Padlocks along with duplicate keys as asked for various valves, marshalling box etc. shall be supplied by the supplier, wherever locking arrangement is provided.

b) Foundation bolts for wheel locking devices of Transformer shall be supplied by the Supplier.

GTP-3: 2 X 5 MVA Transformer, 33/11 kV

Sl. No	Description	Unit	Specification	Bidder's Response
1	Quantity	Nos	2	
2	Rating	MVA	5	
3	Type	—	Oil Filled, Outdoor	
4	Phase	—	3 Phase	
5	Frequency	Hz	50 (±3%)	
6	Cooling	—	ONAN	
7	Mounting	—	Wheels, Rail Mounted	
8	Installation	—	Outdoor	
9	Parallel Operation	—	Required	
10	Fire Protection	—	NIFPS	
11	Condition Monitoring	—	Yes	
12	SCADA Compatibility	—	Yes	
13	Rated Voltage (HV/LV)	kV	33 / 11	
14	Max System Voltage (HV/LV)	kV	36 / 12	
15	Vector Group	—	Dyn11	
16	Winding Connection	—	HV-Delta, LV-Star	
17	No. of Windings	—	2	
18	Earthing	—	Resistance Grounded	
19	Neutral	—	LV side brought out	
20	Tap Changer Type	—	Off Load	
21	Tap Range	%	+5% to –15%	
22	Tap Steps	Nos	17 (1.25% each)	
23	Core Material	—	CRGO (HIB)	
24	Core Type	—	Boltless	
25	Lamination Thickness	mm	0.23–0.27	
26	Flux Density (Normal)	Tesla	1.55	
27	Flux Density (Max)	Tesla	1.9	
28	Magnetizing Current	%	≤1	
29	Winding Material	—	Copper	
30	Current Density	A/mm²	2.4	
31	Overload Capability	—	As per IEC 60076 / IS 6600	
32	Unbalanced Load	%	10	
33	Power Freq Withstand (HV/LV)	kV	70 / 28	
34	Lightning Impulse (HV/LV)	kVp	170 / 75	
35	Short Circuit Level (HV/LV)	kA	31.5 / 25	
36	% Impedance	%	7.15	
37	Impedance Tolerance	%	±10	

38	Top Oil Temp Rise	°C	40	
39	Winding Temp Rise	°C	45	
40	Ambient Temperature	°C	40–45	
41	Clearance Ph-Ph (HV/LV)	mm	400 / 280	
42	Clearance Ph-E (HV/LV)	mm	320 / 140	
43	Clearance in Oil (HV/LV)	mm	40 / 25	
44	Creepage Distance (HV/LV)	mm	972 / 324	
45	HV Bushing	—	36 kV Oil Filled Porcelain	
46	LV Bushing	—	17.5 kV Porcelain	
47	HV Termination	—	3C × 300 sq.mm XLPE	
48	LV Termination	—	3C × 240 sq.mm XLPE	
49	Oil Temp Indicator	—	1 No (SCADA)	
50	Winding Temp Indicator	—	1 No (SCADA)	
51	Polarization Index	—	1.5 to 5	
52	Over Voltage Capability	sec	2	
53	Tank Construction	—	Welded Steel	
54	Tank Pressure Withstand	mmHg	760	
55	Gasket Material	—	Nitrile Rubber	
56	Radiators	—	As required	
57	Lifting Arrangement	—	Provided	
58	Under Carriage	—	Bi-directional Rollers	
59	Standards	—	IEC 60076 / IS	
60	Noise Level	—	As per NEMA TR-1	
61	Fire Safety	—	CEA compliant	

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TECHNICAL SPECIFICATION NO - A03.1
NITROGEN INJECTION FIRE PREVENTION AND EXTINGUISHING SYSTEM

1.0 SCOPE OF WORK

1. This standard specifies the requirements for the nitrogen injection fire prevention and extinguishing system (NIFPES), which shall be provided by the manufacturer as a complete solution. The scope includes the design, supply, installation, connections, testing, commissioning, and after-sales service of the system, along with all associated items specified herein.

2. The scope also encompasses the provision of heat/fire detectors (sensors), hereinafter referred to as detectors, along with required pipes, cable connections, and other necessary components.

3. All components essential for the activation and successful operation of the NIFPES shall be supplied by the manufacturer.

2.0 SPECIFICATIONS

1. Nitrogen injection fire prevention and extinguishing system (NIFPES) shall be designed to prevent the fire from taking place in the transformer and possible explosion of transformer tank due to internal faults/ arcing etc. In case of fire inside the transformer tank, the NIFPES shall be capable of mitigating the fire, minimizing the damage to the transformer, and thus avoiding the spread of fire.

2. NIFPS system shall work on the principle of 'drain and stir' method of transformer oil. On activation of NIFPES, it shall isolate conservator tank oil from the oil in the main transformer tank, drain a pre-determined quantity of oil from the tank top through drain valve to reduce the tank pressure, and inject nitrogen gas from the bottom side of the tank through the inlet valves to create stirring action and reduce the temperature of oil to prevent/ mitigate the fire.

3. On the operation of NIFPES, the quantity of oil removed from the tank shall be such that adequate amount of oil shall remain in the transformer to cover the active part of the transformer that is the 'core-coil' assembly.

4. The NIFPES shall be designed in such a way that in case of external fire, the NIFPES may be operated manually, after electrically isolating the transformers.
5. Electrical isolation of transformer through master trip in addition to breakers shall be an essential pre-condition for activation of NIFPES.

3.0 OPERATIONAL CONTROLS

1. The system operation shall be automatic and shall be activated when the pre-set conditions of activation of the system are attained/triggered. The maximum time period for extinction of fire from commencement of nitrogen injection into the transformer shall be 30 seconds. In addition to automatic operation,

facility for remote operation from the control room and manual operation from the fire extinguishing cubicle (FEC) shall also be provided.

2. The system shall operate in the following situations:

3.1 System Activation in Fire Prevention Mode:

(i) To prevent fire and explosion in the transformer including that from internal fault / arcing, signals from the following shall be used to activate the NIFPES:

a) Operation of any of the protective relays that is differential or restricted earth fault (REF) or over current.

AND

b) Operation of any of the protective relays [Buchholz relay or pressure relief valve (PRV) or the signal from rapid pressure rise relay (RPRR)]

AND

c) Operation / Feedback of tripping of associated circuit breakers or master trip.

(ii) Transformer shall be electrically isolated and then only the NIFPES shall operate. In case of some problem in main protection system, the NIFPES shall derive the activation signal from the backup protection system.

3.2 System Activation in Fire Detection Mode:

(i) In case of fire detection mode, signals from the following shall be used to activate the NIFPES:

a) Heat / fire detectors (sensors).

AND

b) Operation of any of the protective relays [Buchholz relay or pressure relief valve (PRV) or rapid pressure rise relay (RPRR)]

AND

c) Operation / Feedback of tripping of associated circuit breakers or master trip.

(ii) Transformer shall be electrically isolated and then only the NIFPES shall operate. In case of some problem in main protection system the NIFPES shall derive the activation signals from the backup protection system.

3.3 System Activation in Remote / Manual Mode: Manual operation switch with a proper cover to avoid inadvertent operation of the switch, shall be provided in the control room. Interlock shall be provided so that manual operation shall work only when the transformer is completely electrically isolated.

3.4 System Activation in Manual Mode: In case of power failure / any emergency oil drain and nitrogen injection shall be done in manual mode from Fire Extinguishing Cubical. manual operation shall be done when the transformer is completely electrically isolated.

The NIFPES manufacturer should provide the warning information on the control box and fire extinguishing cubicle (FEC) that *"Ensure that HV, IV and LV breakers are open before operating in Manual Mode"* both in Hindi and English and the local language as prevalent.

4.0 Operation of System

(i) On receiving the activation signal, the system shall:

(ii) Open the quick opening oil drain valve within milliseconds to drain the transformer top layer oil (pre-determined quantity) for Explosion Protection with fast depressurization.
(iii) Shut off the transformer conservator isolation valve (TCIV) to prevent flow of oil from the conservator tank to the main transformer tank.
(iv) Open the valve to inject nitrogen into the transformer tank to create stirring of oil.
(v) There shall be interlock to prevent activation of the NIFPES, if the transformer is not electrically isolated. There shall also be provision for isolating the NIFPES during maintenance and /or testing of the transformer.
(vi) The system shall be designed in such a manner that nitrogen purging shall commence only after ensuring that the oil draining has commenced.

5.0 Technical Particulars

The facility shall be provided to test the system by operation of valves [nitrogen injection valve, and oil drain valve (ODV)] when the transformer is in service, without actually draining the oil and injecting nitrogen in real time operation by obtaining the feedback signal from the valve. The nitrogen injection scheme shall be designed in such a way that the nitrogen shall not enter the transformer tank even in case of passing/leakage of valve.

6.0 Details of Supply of System / Equipment and Other Related Activities:

(B) Fire Extinguishing Cubicle (FEC)

(a) The FEC should be made of CRCA sheet of 3 mm thick complete with the base frame, painted inside and outside with post office red color (shade 538 of IS-5).
(b) It shall have hugged split doors fitted with high-quality tamper-proof lock. The degree of protection shall be IP55 for whole assembled Fire Extinguishing Cubicle. The following minimum items are to be provided in the FEC.

(c) Nitrogen gas cylinder with pressure regulator and falling pressure electrical contact manometer.

(d) The Nitrogen scheme shall be designed in such a way that the Nitrogen shall not enter the transformer tank even in case of passing/leakage of valve.

(e) Pressure regulator shall have safety relief valve device for higher temperature compensation.

(f) Oil drain pipe with mechanical quick drain valve. Oil drain pipe should have oil leakage detection mechanism.

(g) Electro mechanical Machine control unit for draining of oil of pre-determined volume and injecting regulated volume of nitrogen gas.

(h) Mechanical release device for oil drain to operate manually in case of DC failure shall be provided in Oil release unit.

(i) Mechanical release device for nitrogen release to operate manually in case of DC failure shall be provided in gas release unit.

(j) Pressure monitoring switch for back-up protection for nitrogen gas release,

(k) Limit switches for monitoring of the system.

(l) Butterfly valve with flanges on the top of panel for connecting fluid oil drain pipe and nitrogen injection pipes for transformer/reactors.

(m) Panel lighting (LED Type).

(n) Fluid Oil drain pipe extension of suitable sizes for connecting pipes to oil pit.

"If the quick-opening oil drain valve/mechanism and the oil leakage detection mechanism for the oil drain valve are not integrated within the fire extinguishing cubicle, they shall be provided separately and shall comply with the specified technical specification."

(C) NIFPES Control Panel

(i) The Control Panel should be made of CRCA sheet of 3 mm thick & Control Panel shall be designed to work on station DC voltage as input control supply provided at site is 110V DC. Control box shall be installed in the control room of the substation for monitoring the NIFPES operation, automatic control and remote operation with alarms, indications, switches, push buttons, audio signal etc. Control Box should be microprocessor based / programmable logic controller (PLC) based with IEC 61850 / RS 485 / TCP IP compatible port or using suitable converters for integration with user's SCADA system. The degree of protection shall be minimum IP50.

(ii) Following minimum indications and alarms shall be provided in the control cubicle in the control room:

(a) DC supply 'ON'
(b) AC supply 'ON'
(c) System healthy
(d) DC supply fail
(e) AC supply fail
(f) System out of service
(g) Differential relay trip
(h) Restricted earth fault (E/F) relay trip
(i) Overcurrent relay trip

(j) PRV trip / RPRR trip
(k) Buchholz relay trip
(l) Master relay trip (HV and LV)
(m) Nitrogen cylinder pressure low
(n) Heat/fire detector/sensor trip.
(o) Heat/fire detector/sensor faulty signal.
(p) Nitrogen injection valve open
(q) Nitrogen injection valve close
(r) Nitrogen injection valve leakage
(s) Oil drain valve open.
(t) Oil drain valve close.
(u) Leakage in oil drain valve
(v) TCIV open
(w) TCIV closed.
(x) Cable fault signal for interconnecting cable for transformer trip signals
(y) Auto operation failed.
(z) NIFPES system in auto mode
(aa) NIFPES system in manual mode
(bb) NIFPES system in test/maintenance mode
(cc) Other indicators, which supplier/user consider necessary shall also be provided.
(dd) The following switch/push buttons shall be provided as a minimum:
(ee) Mode selection switch, auto / manual / (test / Off)
(ff) System reset push button.
(gg) Manual extinction push-button for manual operation of the system
(hh) In case of fire in the transformer and fulfilling the conditions of defined logic for NIFPES operation for fire extinguishing mode or fire prevention mode, alarm (audio and visual) will be available in control room.

(C) Transformer Conservator Isolation Valve

(a) Transformer conservator isolation valve (TCIV) shall be fitted in the conservator pipe line, between conservator and Buchholz relay shall operate for isolating the conservator oil.

(b) The valve will not isolate conservator during normal flow of oil during filtration or filling or refilling, locking plates are provided with handle for pad locking. It should have feature for remote alarm, indication glass with visual closed position indicator similar like Buchholz relay glass inspection window for physical checking of the status of valve. The degree of protection shall be minimum IP67.

(D) Fire detectors

The system will be complete with adequate number of fire detectors fitted on the top cover of the transformer/ reactor oil tank for sensing fire and shall be located at strategic locations specifically bushings/cable box, OLTC, PRV etc. The degree of protection shall be minimum IP67.

(E) Signal box

The signal box shall be mounted at transformer main tank, preferably near the transformer marshalling box, for terminating cable connections from TCIV & fire detectors and for further connection to the control box. The Signal Box should be made of CRCA sheet of 3 mm thick. The degree of protection shall be minimum IP67.

(F) Cables

(i) Fire survival cables (capable to withstand 750° C.) for connection of fire detectors & TCIV.

(ii) All the control / power cables between the NIFPES panel and FEC, shall be Fire Survival Cable type up to the thermal limit (in case of fire and or explosion). Fire survival cables shall be suitable to withstand a temperature of 750 °C.

(iii) Fire Retardant Low Smoke (FRLS) cable shall be used for connection of signal box / marshalling box near transformer and FEC mounted near transformer with control box mounted in control room.

(G) Pipes

Pipes, complete with connections, flanges, bends and tees etc. shall be supplied along with the system.

8.0 Special Terms and Conditions:

(a) Bidder other than OEM shall submit valid dealership certificate along with the bid.

(b) Equipment supplied shall be under warranty for a period of 18 months from the date of supply or 12 months from the date of installation and commissioning.

(c) Test certificate from (NABL accredited lab) of product shall be submitted along with the bid.

(d) Design/Drawing approval shall be taken from concerned OIL engineer before the manufacturing of the NIFPS System at OEM works.

(e) The OEM shall provide a minimum of 15 days' advance intimation to the OIL Engineer for demonstrating the functionality of the offered technology/system at the OEM's workshop. The demonstration shall include live fire and system activation, and the fire must be extinguished within 30 seconds from the commencement of N_2 injection. Acceptance of the item for use in OIL shall be subject to satisfactory demonstration of the technology/system at the OEM's workshop.

(f) Maintenance and testing of the system will be demonstrated by the OEM to the working personnel.

(g) Operation & Maintenance manual shall be supplied with material both in hard and soft copy.

(h) Recommended spare list with cost to be submitted during supply of material.

(i) Contact details for after sales service to be provided.

GTP-4: Nitrogen Injected Fire Protection System (NIFPS)

Sl. No	Description	Unit	Specification	Bidder's Response
1	System Type	—	Nitrogen Injection (Drain & Stir Method)	
2	Scope	—	Design, Supply, Installation, Testing & Commissioning	
3	Application	—	Oil Filled Transformer	
4	Fire Extinction Time	sec	≤ 30	
5	Mode of Operation	—	Automatic / Remote / Manual	
6	Electrical Interlock	—	Operation only after isolation	
7	Activation Logic (Prevention Mode)	—	Relay + Buchholz/PRV/RPRR + Breaker Trip	
8	Activation Logic (Detection Mode)	—	Fire Detector + Buchholz/PRV/RPRR + Breaker Trip	
9	Backup Protection	—	Provided	
10	Oil Drain Valve	—	Quick Opening, Pre-determined Quantity	
11	Oil Retention	—	Core & Coil always submerged	
12	Conservator Isolation	—	TCIV provided	
13	Nitrogen Injection	—	Bottom Injection with Control	
14	Nitrogen Safety	—	No entry on valve leakage	
15	Fire Extinguishing Cubicle	—	CRCA 3 mm, IP55, IS-5 Shade 538	
16	Manual Operation	—	Mechanical (DC failure)	
17	Control Supply	V DC	110	
18	Control System	—	PLC / Microprocessor based	
19	SCADA Interface	—	IEC 61850 / RS485 / TCP-IP	
20	Indications & Alarms	—	Complete (Trip, Valve, Fire, Mode)	
21	Fire Detectors	—	Heat/Fire, IP67	
22	Signal Box	—	CRCA 3 mm, IP67	
23	Cables	—	Fire Survival (750°C) & FRLS	
24	Piping	—	Complete with fittings up to oil pit	
25	In-Service Testing	—	Valve feedback without actual operation	
26	Type Test Certificate	—	NABL Accredited	
27	Demonstration	—	Live fire demo ≤ 30 sec	
28	Warranty	Months	18 (Supply) / 12 (Commissioning)	
29	Documentation	—	Drawings, O&M Manuals, Spares	
30	After Sales Support	—	Contact details required	

TECHNICAL SPECIFICATION NO - A04
500 KVA DRY TYPE DISTRIBUTION TRANSFORMER

1.0 **SCOPE:**

a) Design, Manufacture, testing, supplying and commissioning of two (02) nos. of Vacuum Pressure Impregnated (VPI) 500 kVA, 11/0.433 kV, off-load tap changer, indoor type, resin impregnated windings, dry type transformer as per specification with all the accessories and fittings for efficient and trouble free operation.
b) The **two (02)** transformers shall be designed for continuous parallel operation.
c) The equipment offered shall be complete with all necessary parts for effective and trouble-free operation. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not.
d) It is not intended to specify herein complete details of design and construction. The equipment offered shall conform to all relevant standards and be of high quality, sturdy, robust and of good workmanship and complete design in all respects. The equipment shall be capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements

2.0 **STANDARD:**

a) The design, manufacture and performance of the equipment shall comply with all currently applicable statutes, regulations and safety codes
b) Nothing in this specification shall be construed to relieve the tenderer off his responsibilities.
c) The transformers shall conform to IS: 2026& IS:11171/1985 amended upto date as amended up to date or other International Standards for equal or better performance.
d) Unless otherwise specified, the equipment offered shall conform to the latest applicable Indian, IEC, British or U.S.A. Standards and in particular, to the following: -

IS 2026 amended upto date	Specification for power Transformer
IS:11171 amended upto date	Specifications for Dry-type power transformers
IS:2099 amended upto date	Specification for Bushings for Alternating Voltages above 1000 Volts
IS:3347 amended upto date (part I to V)	Porcelain transformer bushings for use in normal and lightly polluted atmospheres
IS 5	Colours for ready mixed paints and enamels.
IEC 60076-11 or equivalent Indian Standard	

3.0 SPECIFIC TECHNICAL REQUIREMENT:

Rating	500 kVA
Quantity	Two(02) NOS
Voltage Ratio	11/0.433 kV
Vector Group	Dyn11
Temperature Rise	a) Average winding temperature rise over an ambient temperature of 50 deg. C shall not exceed 45deg.C measured by resistance method. i.e. Max. Temperature of the winding shall not exceeds95° C. b) Core, metallic parts and adjacent material shall in no case reach a value that may damage these material or reduce their life expectancies.

4.0 GENERAL CONSTRUCTIONAL FEATURES:

a) All material used shall be of best quality and of the class, most suitable for working-under the conditions specified and shall withstand the variations of temperature and atmospheric conditions, overloads, over-excitation, short-circuits as per specified standards, without distortion or deterioration or the setting up of undue stresses in any part, and also without affecting the strength and suitability of the various parts for the work which they have to perform.

b) The transformer shall be compact and suitable for easy installation at site

c) The transformer shall be provided with 4 Nos. Bi-directional cast iron rollers fitted on cross channels to facilitate the movement of the transformer in both directions.

d) These rollers shall be suitable for being turned through an angle of 90deg. and locked in that position when the transformer/enclosure is jacked up.

e) Steel bolts and nuts shall be galvanized.

f) Transformer shall be suitable for tropical climate & shall be anti-fungal treated. It shall be capable of withstanding thermal effect and stresses caused by short circuit or voltage surges.

g) Rating and diagram plates of stainless steel shall be provided on LT box of the transformer and shall be easily accessible. Rating and diagram plate shall be riveted to the transformer enclosure at a proper height so that it is readable. The rating diagram plate shall bear details as specified in relevant standards.

5.0 **IRON CORE (CRGO)**:

a) The core shall be assembled from high grade cold rolled grain oriented (CRGO) silicon steel Lamination which shall be perfectly insulated on both sides and clamped to minimize vibration & noise.
b) Core fastening bolts shall be insulated to reduce losses and to avoid hot spots. All parts of magnetic circuit shall be effectively connected to earth system.
c) The core clamping structure designed to minimise eddy current loss and bolts shall not pass through the laminations for any purpose.

6.0 **WINDING:**

a) High Voltage and Low Voltage shall be made of high conductivity electrolytic copper & shall be insulated with 'F' class insulation conforming to IS:1271/1985& to withstand thermal & magnetic stresses arising due to through fault current.
b) High voltage windings & low voltage windings shall be completely impregnated with resin. This process shall form the insulation system under vacuum pressure process covering highest electrical and mechanical quality, into which windings shall be voidlessly embedded
c) High Voltage winding shall be designed for connection of R-Y-B phase at 11 kV inside a cable box. The winding shall give the electrical "Delta" formation. The winding shall also be designed to accommodate the Off-Load tap changers as well.
d) Low Voltage winding shall be in star formation. The neutral point shall be brought out of the cable box for solid earthing of the system.

7.0 **LOSSES:**

a) No-load loss at rated voltage and frequency shall not exceed 1.1 kW

b) Load loss at rated current and at 75°C winding temperature shall not exceed 5.5 kW

c) Loss tolerance shall be as per IS 11171 / IEC 60076-11

8.0 **CLEARANCES:** For INDOOR TYPE Transformer (as per CBIP manual)

HV (11 kV)	Ph to Ph	130 mm
	Ph to earth	80 mm
LV	Ph To Ph	25 mm
	Ph to earth	20 mm

9.0 **HT & LT BUSHING:**

A) Transformers HV and LV Bushings of Porcelain/ Epoxy of appropriate voltage and current ratings shall be mounted on opposite side of transformer enclosure in HV and LV cable box The high voltage bushings (3nos.) shall be provided with R-Y-B colour coding marking & shall conform to IS 2099.

B) The low voltage cable box shall be made suitable for adoption of single core XLPE cables For 11 kV transformers, 12 kV rating & for 22 kV transformers, 24 kV rating HV Bushings shall be used and for 433 volts, 1 kV LV Bushings shall be used.

C) Bushings of the same voltage class shall be interchangeable. Bushing with same plain shades as per IS 3347 amended up to date shall be mounted on the side of the enclosure and not on the top cover. Only sheet metal pocket shall be provided for mounting of HV bushing and the same shall not be fixed on pipes. Sheet metal pocket shall be designed in such a way that all HT bushing shall be remain parallel and equidistance throughout. Bushing having type tested as per IS 3347 amended up to date shall only acceptable.

D) Minimum creepage distance for all HV or LV bushings shall not be less than 25 mm per kV.

10.0 **HT & LTCABLE BOXES:**

a) H. T. & L. T. terminal for cable connections shall be brought out through side wall mounted Bushing to a cable end box.
b) Cable end box shall be self-supporting, weatherproof, air filled type with sufficient space inside for termination and connection of cables.
c) Cable end box shall be furnished complete with removable gland plate, double compression brass glands.
d) In general, the arrangement shall be such as to permit of core & coil assembly without dismantling the cable installation.

(i) Suitable arrangement for HV side box and LV side box shall be provided. The LV cable box shall be suitable for terminating the cable, which will approach the boxes vertically from the bottom. The cable box shall be suitable for being detached from the main body with suitable mounting arrangement.
(ii) The H. T. and L. T. cable box shall be fixed on the opposite sides.

Rectangular shaped, M.S. Sheet thickness 2 mm, weather, vermin and dustproof HV/LV Cable box shall be fitted on opposite sides of the enclosure of transformer. (Indoor application): as per details given below:

I. For 11kV:- Air filled cable box suitable for 3 core XLPE aluminum cables of 11 kV voltage grade up to 240 sq.mm. & glands suitable for above cables.
II. For LV 0.433 kV:- Air filled Cable Box suitable to 4 core 240 sq.mm. XLPE aluminum cable of 0.433 kV grade. Cable box shall be spacious enough to accommodate full load current of transformer using 4 run of 4 core 240 sq.mm cable & 1 cable run for neutral.

11.0 **Bushing Terminals:**

a) Brass rods 12 mm. dia. for HT with necessary nuts, check nuts and plain thick tinned washers.

b) LT extension for cable lug connections, with necessary nuts, check nuts and plain thick tinned washers.

12.0 **Terminal marking plates and rating plates:**

Terminals shall be provided with terminal marking plates. The transformer shall provide with riveted rating plate of minimum 18 SWG aluminum anodized material sheet in a visible position. The entries of the rating plate shall be indelibly marked (for example by etching, engraving or stamping).

The name of the company, order No., capacity, month and year of manufacturing shall be engraved on the enclosure of transformer just below the nameplate clearly visible. The engraving can be done on separate plate which shall be firmly welded to enclosure and shall form integral part of the enclosure.

13.0 **ENCLOSURE**

a) The transformer shall be housed in 2 mm thick cold rolled sheet enclosure
b) mounted on bi-directional rollers. Enclosure shall be provided with metal screen at top and bottom for ventilation. Degree of protection of enclosure shall be IP- 43. Transformer enclosure/doors shall be openable type and shall be provided with limit switches and wired accordingly to trip the breaker if the same is opened when the transformer is ON.
c) All surface to be painted shall be thoroughly cleaned, de-scaled, made free from rust & shall be painted with polyurethane paint of shade RAL 7032.
d) An emergency trip push button of lockable type shall be provided at a prominent & convenient place near the transformer to facilitate easy tripping of HV circuit breaker feeding the transformer during an emergency.

14.0 **TOLERANCES:** Tolerances on all the dimensions shall be in accordance with provisions made in the relevant IEC/Indian standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

15.0 **TRANSFORMER FITTINGS:** THE FITTINGS ON THE TRANSFORMERS SHALL BE AS UNDER:

Sr.No	Description	Qty
1	Rating and diagram plate	1 No.
2	Earthing terminals with lugs	2 No.
3	Lifting lugs	2 Nos (for enclosure) and 4 nos. for core & winding

		assembly
4	Platform mounting channel	
5	HV & LV Bushings	3 Nos of HV and 4 Nos of L.V Porcelain/Epoxy Bushing shall be provided with P.G. clamps as per relevant IS 3347 amended up to date.
6	Rollers	4 Nos.
7	Pulling lugs	4 Nos.
8	Cable Box	Only in case of indoor type transformers, HV & LV boxes with glands and connecting sockets as per tech spec

16.0 **DRAWINGS:**

A) A set of the following drawings shall be submitted by the Bidder along with the offer:

I. Type test report
II. Guarantee Technical Parameters (GTP)

B) Successful bidder shall submit the following documents for approval before commencement of manufacturing

i. GENERAL ARRANGEMENT DRAWING.
ii. INTERNAL CONSTRUCTION
iii. TECHNICAL DETAILS (CORE & COIL ASSEMBLY DETAILS) DRAWING.
iv. RATING & DIAGRAM PLATE DRAWING.
v. DETAILS DRAWINGS OF HV/LV BUSHINGS INDICATING CREEPAGE DISTANCES.
vi. DIMENSIONAL DRAWINGS SHOWING THE HV & LV CABLE BOXES.
vii. TRANSPORTATION
viii. DIMENSIONS

17.0 **INSPECTION**

After manufacturing of Transformer, tests shall be carried out on the equipment as per relevant standards at OEM' workshop. Inspection call shall be forwarded by supplier to OIL on 15 days prior to Inspection.

18.0 **TESTS:**

a) The routine tests shall be carried out as per applicable standards and shall be deemed to be included in the VENDOR'S scope. The following additional points/tests shall also be considered as part of routine tests and included in the scope.

1. Ratio, polarity and phase relationship
2. Induced over voltage withstand
3. Separate source voltages withstand.
4. Winding Resistance must be measured at extreme taps also in addition to principal tap.
5. Impedance must be measured at extreme taps also in addition to principal tap.
6. No load loss and exciting current shall be measured at rated frequency at 90%, 100% and 110% rated voltage. These tests shall be done after impulse tests if the latter are specified.
7. No load loss and exciting current shall be measured and recorded with 415V, 3-phase, 50 Hz. Input on LV side.
8. Magnetic circuit (Isolation) test as per relevant standard.
9. Measurement of zero sequence impedance
10. Insulation Resistance

b) In addition, special Tests as listed below shall be carried out as per applicable standards and the BIDDER shall quote extra unit prices for carrying out the same.

a. Partial Discharge test
b. Acoustic Sound Level measurement
c. Short Circuit Test
d. Open Circuit Test
e. Temperature Rise Test

19.0 **TEST AT SITE:**

The following tests on shall be performed by the VENDOR at site at the time of erection and commissioning. Typical checks to be carried out at site are listed below:

(A) Preliminary checks

(a) Compare nameplate details with the specifications

(b) Check for any physical damage, in particular of support insulators

(c) Check tightness of all bolts, clamps and connecting terminals

(d) Check cleanliness of support insulators, core coil assembly, marshalling panels, enclosure, etc.

(e) Check for clearances

(f) Check earthing of transformer supporting structure/enclosure and neutral terminals

(g) Check that the transformer is correctly installed with reference to its phasing and properly aligned with respect to switchgear and interconnecting external bus duct

(h) Check for proper termination support of HV, LV (if applicable) and control

cables, and provision of cable glands for the same

(i) Check for proper alignment and connection of LV side bus bars with switchgear

(j) Check welding/bolting to embedded parts/floor of the building.

(B) Commissioning checks

(a) Insulation resistance test of windings and polarization index on winding
(b) Vector group test
(c) Phase sequence test
(d) Winding resistance test at all taps
(e) Insulation resistance of control wiring
(f) Core loss test at service tap
(g) Voltage/turns ratio at all the taps
(h) Magnetic current balance at full voltage
(i) Capacitance and tan delta measurement
(j) Tests on current transformers (k) Continuity test
(l) Polarity test
(m) IR tests
(n) Magnetization characteristics
(o) Ratio test
(p) Secondary winding resistance measurement
(q) Measurement of mV drop across HV & LV power connections and joints.

20.0 **NOTES:**

a) Neutral CT terminal shall be brought to marshalling box by VENDOR. Link shall be provided on the marshalling box terminal for CT secondary terminal shorting. Neutral CT shall be provided after neutral bifurcation.

b) Cabling for winding temperature indicator till marshalling box shall be in VENDOR's scope. Necessary arrangement for taking this cable till marshalling box shall be provided on transformer enclosure by VENDOR.

c) Inside the marshalling box the contact of WTI shall be wired by 1.5 sq mm PVC wires. Contacts of instruments shall be wired to marshalling box in such a way that all alarm contact shall be placed together.

d) The entire transformer shall be witnessed for routine test. VENDOR shall submit test certificates for heat run test & impulse test for transformer of similar rating along with the Bid.

e) Epoxy insulator support of neutral earthing conductor from neutral bus bar to bottom of the transformer shall be provided by VENDOR. Copper link shall be provided on neutral bushing for external neutral earth strip connection. Surge arrester of appropriate voltage rating shall be provided by VENDOR. Glass fibre enclosure of housing the surge arrester inside the transformer cubicle shall be provided by VENDOR.

GTP-5: Dry Type Transformer – 500 kVA, 11/0.433 kV

Sr. No.	Particulars	Unit	Specified Value	Bidder's Remark
1.0	General Details			
1.1	Manufacturer	—	To be specified by bidder	
1.2	Type	—	VPI Dry Type, Indoor	
1.3	Reference Standard	—	IS 2026, IS 11171, IEC 60076-11	
2.0	Full Load Rating	kVA	500	
3.0	Number of Phases	—	Three Phase	
4.0	Rated Voltage			
4.1	HV Voltage	kV	11	
4.2	LV Voltage	kV	0.433	
5.0	Type of Cooling	—	AN (Air Natural)	
6.0	Percentage Impedance	%	~6% (Typical as per IS)	
7.0	Winding Connections			
7.1	HV	—	Delta	
7.2	LV	—	Star (Neutral brought out)	
7.3	Vector Group	—	Dyn11	
8.0	Tapping Details			
8.1	Type of Tap Changer	—	Off-load tap changer	
8.2	Total Tapping Range	%	±5%	
8.3	Tapping Steps	%	2.5% steps	
8.4	Location	—	HV side	
9.0	Windings			
9.1	Conductor Material (HV/LV)	—	Electrolytic Copper	
9.2	Insulation Class (HV/LV)	—	Class F	
9.3	Insulation System	—	Resin Impregnated (VPI)	
10.0	Max Temperature Rise	°C	45°C (over 50°C ambient)	
11.0	Load Loss at 75°C	kW	≤ 5.5	
12.0	No Load Loss	kW	≤ 1.1	
13.0	Cooling Equipment Loss	—	Nil (AN cooling)	
14.0	Magnetizing Current	%	≤ 2% (Typical)	
15.0	Noise Level	dB	≤ 65 dB (Typical)	
16.0	Weight			
16.1	Windings	kg	To be specified	
16.2	Core	kg	To be specified	
16.3	Total Weight	kg	To be specified	
17.0	Efficiency	%		
17.1	At Full Load (UPF)	%	≥ 98%	
17.2	At 75% Load	%	≥ 98.5%	
17.3	At 50% Load	%	≥ 99%	

TECHNICAL SPECIFICATION NO - A05
LT PANEL

1.0 **SCOPE**:

This specification covers:

Design, manufacture, assembly and testing at manufacturer's works, supply and delivery of 415V L.T. Panel along with complete accessories and Installation and commissioning.

2.0 **STANDARDS:**

Applicable standard IS/IEC 61439 with latest amendments

3.0 **GENERAL DESIGN OF SWITCH BOARD CUBICLE:**

(A) The panel should have following features.

1) Panel shall be indoor, industrial, cubicle type with provision of extension of panels in future.
2) Panel shall be built on Self-supporting, floor mounting, industrial type rigid framework.
3) Panel shall be sheet steel clad made of 14 SWG MS CRCA sheets and built upon suitably sized MS angle iron framework.
4) Panel must be dust / vermin proof and weatherproof with IP 54 degree of potection.
5) Panel must be designed for ambient of 45 Deg.C.(Max)and 5 Deg.C.(Min) and Humidity-95% (Max).
6) Bottom detachable gland plates made from 3 mm thick MS CR sheet must be provided for all cable entries.
7) Unless specified all the cable entry / exit shall be at the bottom of the panel.
8) The entire metal work must be given seven tanks anti corrosion treatment and then powder coated. Colour- DA GREY.
9) Special non-deteriorating Neoprene rubber gaskets must be provided between all joints.
10) All feeders shall be suitable for operation from front side and must have provision of inspection from backside.
11) All panel doors shall be provided with single turn latches for opening / closing.
12) Internal barriers shall be provided between cubicles to provide Form-2 separation as per IEC to prevent transmission of flashover from one panel to other panels.
13) Danger plates must be fitted on front and back of the panel.
14) Legend plates of the feeders and starters shall be provided in the front as well as at back of each feeder/panel.
15) Adequate nos. of lifting lugs / hooks must be provided on top.
16) Ventilation louvers must be guarded with wire mesh.
17) Separate terminal blocks are provided for control and power wiring. Power terminal blocks shall be rated at minimum of 90 Deg. C. Terminal Blocks should be clearly marked at both inputs and outputs.

18) All non-current carrying metallic parts shall be grounded. All the equipment having earthing terminal shall be grounded with suitably rated, PVC insulated, flexible copper earth wires or copper braids of suitable rating as per IS - 3043.
19) Earthing bus must be provided at bottom of the panel. Earthing Bus must be made of 50 x 6 mm GI straps with 80-micron galvanisation thickness. Brought out studs must be provided on two sides complete with suitably sized zinc passivated double nuts and spring washers. Earth bus must have holes drilled for connection with main earth electrodes and earth cable/ strap of outgoing feeders.
20) A prominently visible legend reading "415V LT PANEL" shall be provided at the top center of the panel. The lettering shall be of appropriate size, clearly legible from a reasonable viewing distance, and permanently fixed.

    In addition to the legend, a separate durable nameplate shall be securely affixed on the panel. The nameplate shall be made of non-corrosive material with engraved or printed markings that are permanent and resistant to fading.

    The nameplate shall include, as a minimum, the following details:

    a) Manufacturer's Make and Model
    b) Year of Manufacturing
    c) Oil India Limited Purchase Order Number
    d) Bus Bar Capacity
    e) Short Time Current (STC) Rating
    f) Any other relevant technical or identification information as required

21) Each of the outgoing feeders must have Earth Leakage Protection with separate CBCT & ELR. EL current Range: 0-1A, adjustable in preferred steps of 50/100mA. Trip Time Range: 0-1s, adjustable in preferred steps of 50/100ms.
22) All outgoing MCCB feeders should have Pad locking arrangement for safety & sealing purposes.

(B) TECHNICAL SPECIFICATIONS OF LT PANEL

(I) THE PANEL SHOULD HAVE THREE DISTINCT SECTIONS AS BELOW.

1. Incomer & Bus coupler section: consisting of 5 nos. 1000 A LT ACB with all controls, protection and metering. These LT ACBs will be used as:

(a) LT Incomer-1 from Station Transformer - 1,
(b) LT Bus Coupler,
(c) LT Incomer-2 from Station Transformer - 2,
(d) LT Incomer - 3 from E-House Solar,
(e) Spare

2.Outgoing feeder section: on the left side of incomer section. Outgoing feeders shall be
(a) 400A MCCB feeder - 2 nos.
(b) Other Outgoing Feeders (Load-Based MCCB/MCB Selection)

3. Outgoing feeder section-2: on the right side of incomer section. Outgoing feeders shall be (a) 400A MCCB feeder - 2 nos. (b) Other Outgoing Feeders (Load-Based MCCB/MCB Selection)

(II) INCOMERS & BUS COUPLER:

Five nos. 1000 Amps, 4 pole 415V (Ue), 600V (Ui), 65 kA or above breaking capacity rated electrically operated Draw-out type Air circuit breaker, with microprocessor-based release for over current, short-circuit and ground fault protection with distinct fault indication shall be used for the below mentioned Incomer and Bus Couplers. The ACBs shall conform to IS/IEC 60947-2 / IS 13947-2, tropicalized to Class-II (high humidity); breaking capacity minimum 65 KA at rated service voltage; the overload (long time), short circuit (short time) and earth fault current settings shall be selectable including individual time settings. Each ACB incomer panels shall be fitted with 1 digital multifunction meter, 1 analog voltmeter (Size - 90mm x 90mm), 1 analog Ammeter (Size - 90mm x 90mm) with selector switch, LED indication lamps for R Y B "ON" status, suitable CTs, TNC switch, fuse etc.

Make of ACBs: Schneider (Masterpact NW series) / GE (Entelliguard series) / Siemens (3WL series) / ABB (SACE Emax series)/ L&T (U-Power OMEGA series) / or higher versions/series of these companies.

The Bus Coupler ACB Panel shall be fitted with a suitable Check-Synch Relay. The Check-Synch Relay is for checking the electrical synchronising conditions of the supply at both ends of the bus coupler. Bus-Coupler ACB closing shall be linked with the Check-Synch relay. Bus coupler ACB shall close only when (a) Electrical Supply at the both ends is in synchronous condition (b) any of the Bus-Coupler ends is Dead (No Supply)
These Five ACB panels shall have legends as given below.
a) Incomer ACB: Station Transformer - 1
b) Bus Coupler ACB
c) Incomer ACB: Station Transformer - 2
d) Incomer ACB: From E-House Solar
e) Spare

(III) BUS CHAMBER

1. The bus chamber must be sheet steel clad having front and rear bolted covers and shall consist of 1 set TP & N electrolytic grade, IACS 99.9% conductivity, rectangular section, electro-tinned copper bus bars, conforming to IS: 613. Current rating of bus bar sections must be minimum 1500 Amps, suitable for 600 V AC, 50 Hz system. Neutral bar must be of same size as phase bus.

2. The bus-bar must be insulated with heat shrinkable PVC sleeves and must be supported at required intervals with non- hygroscopic, non-deteriorating, and non-inflammable SMC / FRP supports having adequate mechanical strength and a high tracking resistance, to withstand short circuit fault levels up to 70 kA for 1 sec.

3. The bus-bar individual phases shall be colour coded for easy identification. Main bus-bars shall be full length of the panel. Vertically dropped buses from the main bus shall power individual feeder panels. Vertical bus-bars shall also be full vertical length of the panel. Sufficient clearance shall be maintained in the bus chamber for proper cooling of the bus-bar. Bus-bar should be extendible type to facilitate addition of cubicles and switches in future.

4. All risers and connections from bus bar must be done with same material as the main bus bars of current rating as per rating of individual cubicle switch. To suit the stringent site conditions, the bus bar system must be designed with generous clearance between phases than specified in the standards. Adequate non-hygroscopic insulating sheet barriers between the bus chambers and feeders must be provided.

5. The manufacturer of the panel must have CPRI test certificate and temperature rise certificate for bus bar fault level of 70kA. A copy of the CPRI test certificate shall be enclosed with the offer.

(IV) OUTGOING FEEDERS:

(1) 4 nos. of 400 Amps, Four Pole(TPN), draw-out type MCCB with breaking capacity minimum 50 kA with adjustable OL protection from 0.4 X In. Out of these four feeders, two nos. shall be on the Outgoing feeder section-1(On the left side of the incomer section) and other two nos. shall be on the Outgoing feeder section-2(On the right side of the incomer section).

All these MCCB feeders shall have following protections,
i) Short Circuit protection (4In to 10In)
ii) Adjustable overload (OL) protection (from 0.4xIn) & earth fault (EF) protection through inbuilt electronic trip unit in MCCB
iii) Earth-leakage protection through separate CBCT & ELR. EL current Range: 30mA - 1A, adjustable in preferred steps of 50/100mA. Trip Time Range: 0-1s, adjustable in preferred steps of 50/100ms. The relay must have indication LEDs, test push button and reset push button and shall be duly wired up to trip MCCB in case of earth leakage.

(2) Other Outgoing Feeders (Load-Based MCCB/MCB Selection):

Other Outgoing feeders shall be provided based on the actual load requirements of the system. The rating and quantity of feeders shall be finalized by the contractor during detailed engineering, considering the connected and future loads.
However, the following feeders are mandatory and shall be provided as per the approved SLD:

- UPS Feeders – 2 Nos. (1 from each bus section), each feeder shall be provided with suitably rated MCCB, selected based on the connected load and system fault level.

- Battery Charger Feeders – 2 Nos. (1 from each bus section), each feeder shall be provided with suitably rated MCCB, selected based on the connected load and system fault level.

- Switchgear Power Supply Feeder – 1 No., provided with suitably rated MCCB, selected based on the connected load and system fault level.

The panel shall further include outgoing feeders for, but not limited to, the following loads:

- E-House Lighting
- Power Distribution Boards
- AC Supply Systems
- Marshalling Boxes
- Outdoor Area Lighting
- SCADA / SAS / EMS Systems
- NIFPS (Fire Protection System)
- CCTV System
- 3-Phase Supply for Power Transformers
- Overhead Crane and other mechanical loads

Each outgoing feeder shall be equipped with suitably rated MCCB or MCB, selected based on load current, fault level.

All outgoing feeders shall be distributed appropriately across both outgoing sections (left and right of incomer section) for load balancing and operational flexibility.

Protection Requirements for All Outgoing Feeders

All MCCB feeders shall be provided with the following protections:

i) Short Circuit Protection: Adjustable (typically 4 In to 10 In or as per manufacturer standard)
ii) Overload Protection (OL): Adjustable from 0.4 × In or better
iii) Earth Fault Protection (EF): Through inbuilt electronic trip unit (where applicable)
iv) Earth Leakage Protection: Through separate CBCT & ELR with:

- Current range: 30 mA to 1 A (adjustable in steps of 50/100 mA)
- Time delay: 0 to 1 sec (adjustable in steps of 50/100 ms)
- LED indications, Test & Reset push buttons
- Automatic tripping of feeder in case of leakage

For smaller loads, MCBs with RCBO/ELCB protection may be used where technically suitable.

(V) GENERAL SPECIFICATIONS FOR OUTGOING FEEDERS:

All the MCCBs shall comprise following features for total safety of installation and operating personnel.

1) Line-Load Reversibility: to allow line or load connections from top or bottom terminals without any risk of unsafe operation or protection performance of MCCB.

2) High Endurance Level: to allow prolonged and un-interrupted use of product.

3) Thermal-Magnetic Trip Unit: Offered MCCBs shall have Thermal-Magnetic Trip Unit for protection against Overload and Short-Circuit faults, respectively.

4) Test-Trip button: MCCBs shall have a 'Push to Trip' test button on front face to test healthiness of Trip unit.

5) ON-OFF-Trip Position marking: MCCBs shall have well defined and identified ON, OFF, & Trip positions marked on front face of the MCCB in accordance with Indian and International standards.

6) Phase Barriers: Phase Barriers shall be provided on MCCBs to prevent travel of arc between phases during any short circuit fault, and for maximum insulation between phases at power terminals.

7) Accessories: Offered MCCBs shall have provision for mounting internal and/or external accessories like Auxiliary Contact, etc.

8) Ease of Identification: Basic technical parameters, i.e. rating, operating voltage, breaking capacity, etc. shall be identified on front face of MCCB.

9) Degree of Protection: Bare MCCB shall have minimum IP20 degree of protection.

10) Compliance to Environmental Protection & Topicalization: MCCBs shall have compliance to Environmental Protection, and Tropicalisation Standards for performance under extreme atmospheric conditions.

11) Mechanical Environment: MCCBS used in the system shall be able to withstand stringent mechanical environment conditions like vibration and shock tests.

12) Ambient: MCCBs shall be suitable for use between -5 to 50°C temperature conditions. However, for temperature higher than 40°C ambient, suitable de-ration should be done on the rating of MCCB.

13) Rated Insulation Voltage for all the MCCBs shall be 690V

14) Utilisation category for all the MCCBs : Category - A

(VI) METERING:

The LT Panel should have followed metering:

(1) Analog Voltmeter with selector switch on all the 3 nos. ACB incomer panels. Voltmeter is not required on Bus Coupler Panel.

Make: AE/Secure/Rishabh,
Meter Size: 96mm X 96mm
Accuracy: 0.5
Voltage range: 0 - 500V
Total Qty: 03 nos.

(2) Analog Ammeter with selector switch on all the 3 nos. ACB incomer panels complete with required CTs.
Make : AE/Secure/Rishabh
Meter Size: 96mm X 96mm
Accuracy: 0.5
Current range: 0 - 1000A
Total Qty: 03 nos.

(3) Panel mounted 3 phase 4 wire digital Multifunction meter having features of reading maximum, minimum and average value, suitable for balanced/unbalanced load, with LCD (Back-Lit) display & with minimum 3 line simultaneous display to be provided on all the 5 nos. ACB incomer panels, to measure minimum following parameters:

(i) Active/Reactive/Apparent Power
(ii) Active /Reactive/Apparent Energy
(iii)Frequency
(iv) Line Current
(v) Power Factor
(vi) Phase Voltage
(vii)THD

Model: Meter should be equivalent / better than Model - 'RISH Master 3480 - 3 - 110 - D - R - D - 2' of Rishabh Instruments Pvt. Ltd., Nashik, India.
Make: Rishabh / Schneider / AE
Minimum Display Size: 96mm X 96mm
Display Type: Graphical LCD Display having Resolution: Minimum 320 x 240
Accuracy: Voltage/Current/Active Power/Re-Active Power/Active Energy (KWh)/Re Active Energy (KVARh) / Apparent Energy (kVAh) : +/- 0.5% of range; Frequency: +/- 0.15%, Power factor: +/- 1% of Unity, THD: +/- 1%.
Total Qty.: 03 nos.

(4) Digital Ammeter on all the 315A outgoing feeders.

Make : AE/Secure/Rishabh / Schneider or equivalent
Accuracy : +/- 0.5%
Resolution : Minimum 0.1 Ampere
Total Qty : 04 no's
Make : AE / Secure / Rishabh / Schneider,

(VII) INDICATION LAMPS:

Suitably Coloured LED indication lamps to be provided for the indication of power availability (Red, Yellow, Blue), ACB and MCCB status (ON, OFF, TRIP, Spring Charge, Test & Service etc.) in all incomer and outgoing feeders as per standard requirement.

Designation name plate (for identification) of all individual indication lamps shall also be provided.

Make of LED indication lamp: Binay/Teknic/Siemens/ESBEE.

(VIII) PANEL WIRING:

1) All internal wiring and cabling inside the panels should be done with 1.1 KV grade fire retardant PVC insulated tinned copper multi-stranded flexible cables with proper lugs. All wires and cable should have proper ferrule numbers for easy identification.

2) Ring lugs should be used at all critical connections such as CT connections. No more than two wires or lugs may be attached under any one screw. All control & CT wiring should be terminated on suitable TBs. All terminal strips to have minimum 2 nos. spare terminals to accommodate any modification required during commissioning / operation. All terminal strips should be accessible for testing and troubleshooting/maintenance.

3) All control wiring inside the panels should be done with single core, flame retardant multi-stranded flexible copper PVC insulated (1100 V) wire, 1.5 mm2 for potential circuits and 2.5 mm2 for current circuits. Control wires should be properly identified with ferrule numbers and suitably terminated with proper sized lugs.
cable make- Finolex/Havells/Henley/Nicco/Reputed brand.

(IX) MISC. COMMISSIONING ITEMS: All the items required for installation & commissioning of the panel like Cable Termination Kits, Cable Termination Lugs and Cable Gland etc. shall be supplied by the contractor. OIL shall provide only the cables both at the incomer and outgoing side.

Along with other items party should supply total 12 sets of indoor type, Heat Shrinkable end termination kit for 3.5 Core, 1100 Volt grade, 400Sq.mm XLPE armoured cables (Incomer Cables). Make of the termination Kits: Raychem/Heat shrink/ Xicon

(C) INSPECTION:

1) Inspection and Testing of the panel as per our technical specification and applicable Indian Standard shall be carried out in presence of OIL's Engineer at manufacturer's works.

2) The Supplier shall give intimation to OIL at least 15 days in advance prior to commencement of the tests so that OIL can depute representative for witnessing tests in time.

3) Panel should be despatched only after the written clearance from OIL after the inspection & testing of the panel at the manufacturer's works.

4) Materials / equipment's failed to conform to the specifications during testing, OIL's representatives shall have the right to reject the materials, and in that case, the supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of cost.

GTP-6: LT PANEL

Parameter	Specified Requirement	Bidder to Fill / Remark
1. GENERAL DETAILS		
Manufacturer Name & Make	To be specified by bidder	
Model / Type of Panel	415V LT Panel, Indoor, Cubicle Type	
Applicable Standard	IS/IEC 61439 (Latest)	
Degree of Protection	IP 54	
2. PANEL CONSTRUCTION		
Panel Type	Indoor, Floor Mounted, Extendable	
Sheet Steel Thickness	14 SWG CRCA (Panel), 3 mm Gland Plate	
Form of Separation	Form-2 (IEC)	
Ambient Suitability	45°C Max, 5°C Min, 95% RH	
Earthing Bus	50 × 6 mm GI, 80 micron galvanised	
3. INCOMER & BUS COUPLER		
No. of ACBs	5 Nos.	
ACB Rating	1000 A, 4 Pole	
Voltage Rating	415V (Ue), 600V (Ui)	
Breaking Capacity	≥ 65 kA	
Type	Draw-out, Electrically Operated	
Protection Type	Microprocessor-based (OL, SC, EF)	
Make of ACB	Schneider / ABB / Siemens / L&T / GE	
Check-Synch Relay	Required for Bus Coupler	
4. BUS BAR SYSTEM		
Bus Bar Material	Electrolytic Copper (99.9% conductivity)	
Bus Bar Rating	≥ 1500 A	
Short Circuit Withstand	70 kA for 1 sec	
Insulation Type	Heat Shrinkable PVC Sleeve	
CPRI Test Certificate	Mandatory	
5. OUTGOING FEEDERS		
400A MCCB Feeders	4 Nos., TPN, Draw-out	
MCCB Breaking Capacity	≥ 50 kA	
Protection	OL, SC, EF (Adjustable)	
Earth Leakage Protection	CBCT + ELR (30 mA – 1 A, adjustable)	
Other Feeders	UPS, Battery, Lighting,	

	SCADA, NIFPS, etc.	
6. MCCB FEATURES		
Trip Unit Type	Thermal-Magnetic / Electronic	
Rated Insulation Voltage	690 V	
IP Protection	Minimum IP20	
Operating Temperature	-5°C to 50°C	
7. METERING		
Multifunction Meter	Rishabh / Schneider / AE	
Meter Accuracy	Class 0.5	
Parameters	V, I, kW, kVAR, kVA, PF, Hz, Energy, THD	
Analog Meters	Voltmeter & Ammeter (on 3 incomers)	
8. WIRING & COMPONENTS		
Control Cable Size	1.5 sq.mm (control), 2.5 sq.mm (CT)	
Cable Make	Finolex / Havells / Nicco / Henley	
Terminal Blocks	Marked, with spare terminals	
9. SAFETY & COMPLIANCE		
Earthing Compliance	As per IS 3043	
Interlocking / Protection	Provided (door interlock, EL protection)	
10. ACCESSORIES & TESTING		
Termination Kits	12 Sets (400 sq.mm, Heat Shrink)	
Routine / Type Tests	As per IS/IEC 61439	
Inspection	Pre-dispatch with OIL approval	
11. DEVIATIONS		
List of Deviations	To be clearly indicated	

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TECHNICAL SPECIFICATION NO - A06
GRID SYNCHRONIZATION CONTROL

1.0 SCOPE:

The scope of this tender requires the bidder to design, develop and implement a synchronization scheme between the existing 3 MW Gas Engine Generator (GEG) and Grid of state utility (AEGCL) at 11 kV as pe the guidelines of Indian Electricity Grid Code (IEGC)

(A) GENERAL GUIDELINES:

i) Bidder shall study the existing synchronization scheme operating in Moran Power Station between Gas Engine Generator and Gas Turbine Generator (GTG).

ii) Bidder shall co-ordinate with OEM or authorized dealer of GEG to design, develop, modify and implement a new synchronization scheme between GEG and State Utility Grid. The synchronization will be carried out at 11 kV switchgear panel installed inside the E-house. Representatives from OIL will also extend necessary support during co-ordination with the OEM/Authorised dealer of GEG.

iii) The design of the synchronization scheme shall meet the following objectives:
   a) Minimize the modification in the existing infrastructure.
   b) Synchronization operations shall be simple as the same will be carried out by JEs.
   c) Strict Adherence to grid code
   d) Flexibility of synchronization breakers
   e) Ensuring safety of the equipment and personnel at all

iv) Implementation of synchronization scheme during project execution shall be planned in a way to minimize the requirement of any complete power shutdown.

v) Provision for both Auto and Manual mode of synchronization shall be included in the synchronization panel. The panel shall be installed inside the control of the E-house enabling the operated to carry out both auto and manual operation from the control room only.

vi) Integration, communication of the new control panel with the existing panel of GEG shall be under the scope of bidder only.

vii) Both type of synchronization shall be demonstrated to the working personnel at site for clear understanding of the workings.

(B) OPERATION PHILOSOPHY:

The project is envisaged as replacement of existing 2X3 MW GTG units. After completion of the project, following operations philosophy will be adopted fulfil the energy demand round the clock:

i) Primary Source: Grid Power
ii) Back Up Source: 3 MW GEG

Existing 3 MW GEG will continue as back up source and will be put in

operation only during the following conditions:

a) Grid Power Failure
b) Maintenance of Grid incoming panel or power transformer
c) Test run of GEG

In such scenario, synchronization of GEG with grid will be crucial to ensure minimum power interruption.

(C) SYNCHRONIZATION SCHEME:

Proposed synchronization scheme must fulfill the following operational conditions:

Condition 1	Load transfer from Grid source to GEG Source without power interruption.
Condition 2	Load transfer from GEG Source to Grid Source without power interruption.
Condition 3	Dead bus synchronisation from Grid Source.
Condition 4	Dead bus synchronisation from 1X3 MW GEG source.

For better understanding, a tentative representation is attached with this specification as A06.1. In addition, a breaker matrix is also shared below in reference to the Annexure:

Scenario	**Primary source (Grid)**	**Back Up Source (GEG)**	**Synchronising Breaker**
Power Failure/ Blackout	Failure	Incoming	GEG breaker (F)
Power Failure/ Blackout	Incoming	Failure	1) Tr breakers (A & B)
Load Changeover/ GEG testing	ON	Incoming	GEG breaker (F)
Load Changeover/ GEG testing	Incoming	ON	Tr breakers (A & B)

For safety reasons, Synch-check protection shall be made available at breakers D, C, E, G, H & I as per Attachment A06.2.

Further, a tentative synchronisation scheme from GEG OEM is also attached for reference as A06.2

GTP-7: Grid Synchronization Control (3 MW GEG & 11 kV Grid)

Parameter	Specified Requirement	Bidder's Remark
1. GENERAL DETAILS		
Project Description	Synchronization of 3 MW GEG with 11 kV Grid (AEGCL)	
Applicable Code	Indian Electricity Grid Code (IEGC)	
System Voltage Level	11 kV	
Type of System	Grid + Generator Synchronization	
2. DESIGN & IMPLEMENTATION		
Design Responsibility	Bidder in coordination with GEG OEM	
Integration with Existing System	Required with existing GEG panel	
Modification Requirement	Minimum modification to existing system	
Location of Synchronization Panel	E-House Control Room	
Operation Accessibility	From Control Room	
3. SYNCHRONIZATION MODES		
Auto Synchronization	Provided	
Manual Synchronization	Provided	
Ease of Operation	Suitable for JE-level operation	
Demonstration & Training	Mandatory at site	
4. OPERATION PHILOSOPHY		
Primary Source	Grid Supply	
Backup Source	3 MW Gas Engine Generator	
GEG Operation Conditions	Grid failure / maintenance / testing	
Synchronization Objective	No interruption during changeover	
5. FUNCTIONAL REQUIREMENTS		
Grid → GEG Load Transfer	Without interruption	
GEG → Grid Load Transfer	Without interruption	
Dead Bus Synchronization (Grid)	Provided	
Dead Bus Synchronization (GEG)	Provided	
Synchronization Flexibility	Multiple breaker operation	
Shutdown Requirement	Minimal / No complete shutdown	
6. SYNCHRONIZING EQUIPMENT		
Synchronizing Relay	Microprocessor-based Sync Check Relay	
Synchroscope	Provided (for manual mode)	

Voltage Matching	Automatic	
Frequency Matching	Automatic	
Phase Angle Matching	Automatic	
Closing Control	Automatic & Manual	
7. PROTECTION SYSTEM		
Synch-Check Protection	Provided	
Breakers Covered	D, C, E, G, H & I	
Protection Compliance	As per IEGC	
Safety Interlocks	Provided	
8. BREAKER LOGIC & CONTROL		
Synchronizing Breaker	GEG Breaker (F) / Transformer Breakers (A & B)	
Control Logic	As per breaker matrix	
Blackout Handling	Automatic synchronization provision	
Load Transfer Logic	Seamless transition	
9. COMMUNICATION & INTEGRATION		
Integration with Existing GEG Panel	Required	
Communication Protocol	IEC / Modbus / TCP-IP (as applicable)	
SCADA Compatibility	Required	
Control Wiring & Interface	In bidder scope	
10. SAFETY & COMPLIANCE		
Grid Code Compliance	Mandatory (IEGC)	
Personnel Safety	Ensured through interlocks	
Equipment Safety	Protection & synchronization checks	
Fail-Safe Operation	Required	
11. TESTING & COMMISSIONING		
Factory Testing	Required	
Site Testing	Required	
Auto Synchronization Test	Mandatory	
Manual Synchronization Test	Mandatory	
Functional Demonstration	Required	
12. DOCUMENTATION		
SLD Submission	Required	
Control Logic Diagram	Required	
OEM Coordination Documents	Required	
O&M Manual	Required	
Training Documents	Required	
13. DEVIATIONS		
List of Deviations	To be clearly indicated	

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Technical Specification No - A07
Substation Automation System (SAS)

1. Scope of Substation Automation System:

The Substation Automation System (SAS) shall comprise a fully integrated system for protection, control, monitoring, automation, disturbance recording, event recording, alarm management, and remote communication for a 33/11 kV substation. The scope includes detailed engineering, design, manufacture, supply, configuration, testing, commissioning, documentation, and training of the complete SAS. The system shall be designed to ensure high availability, scalability, interoperability, cybersecurity, and long-term maintainability.2. Standards and Compliance.

2. Standards and Compliance:

The SAS shall be designed, engineered, and implemented in compliance with IEC 61850 (latest applicable edition), including station bus communication using MMS and GOOSE messaging. Protection and control IEDs shall comply with IEC 60255. Remote communication shall comply with IEC 60870-5-104. Cybersecurity requirements shall comply with IEC 62351. Electromagnetic compatibility shall comply with IEC 61000 series standards. Time synchronization shall comply with IEEE 1588 v2 and/or IRIG-B standards. Any deviation from the applicable standards shall be explicitly stated in the bid.

3. System Architecture Philosophy:

The SAS shall be based on a distributed, hierarchical architecture consisting of Bay Level, Station Level, and Remote Level systems. All protection and control functions shall be performed at Bay Level using intelligent electronic devices (IEDs). Station Level shall provide centralized monitoring, control, data concentration, event management, and gateway functionality. Remote Level shall interface with the Load Dispatch Centre or centralized control room. The system shall use Ethernet-based communication with redundancy to eliminate single points of failure.

4. Station Level System:

At station level, numerical protection and control IEDs shall be provided for all 33 kV feeders, 11 kV feeders, power transformers, bus couplers, and incomers as applicable. Each IED shall be capable of performing protection, control, measurement, monitoring, event recording, and disturbance recording functions. IEDs shall support IEC 61850 MMS and GOOSE communication natively without protocol converters. All protection functions, logic schemes, interlocking, and automation shall be implemented within the IEDs to ensure fail-safe operation independent of station level systems.

The IEDs shall provide time-stamped events. Disturbance records shall be stored in non-volatile memory and shall be retrievable locally and remotely. IEDs shall include self-diagnostics, watchdog supervision, and health monitoring alarms.
The status (ON/OFF) of all 33 kV & 11 kV breakers shall be monitored and displayed continuously by SAS.

5. Communication Network

The SAS communication network shall be based on an Ethernet station bus architecture

using industrial-grade managed switches. The network shall be designed with redundancy using PRP or HSR or equivalent redundancy protocols to avoid single points of failure. VLAN segregation shall be implemented to separate protection traffic, SCADA traffic, and engineering access. Network devices shall support SNMP for monitoring and diagnostics.

6. Time Synchronization

A GPS/GNSS-based master clock shall be provided to synchronize all IEDs, servers, and gateways. Time synchronization shall be distributed using IEEE 1588 v2 (PTP) and/or IRIG-B and SNTP as required. The system shall ensure event and disturbance record synchronization accuracy better than 1 microsecond across the substation.

7. Cybersecurity

The SAS shall incorporate cybersecurity measures in compliance with IEC 62351 and utility cybersecurity policies. This shall include role-based access control, password management, secure communication, firewall protection, system logging, and controlled use of external storage devices. All default passwords shall be changed during commissioning.

8. Power Supply

All SAS equipment shall be powered from the substation UPS/DC system. Station level servers and networking equipment shall be provided with redundant power supplies and automatic changeover.

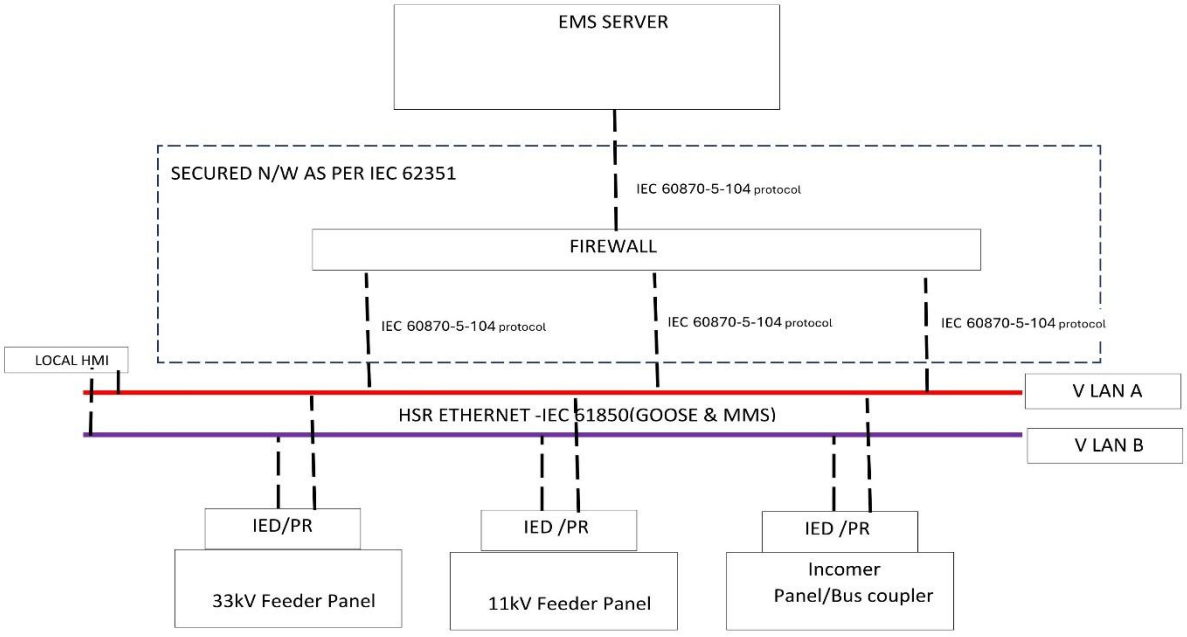
9. Engineering, Testing, and Commissioning:

The bidder shall be responsible for complete system engineering, including protection logic, IEC 61850 configuration, network design, and system integration. Factory Acceptance Tests (FAT) shall include functional testing, IEC 61850 communication testing, GOOSE messaging verification, redundancy testing, and cybersecurity checks. Site Acceptance Tests (SAT) shall include end-to-end testing, interlocking verification, remote control testing, and failover testing.

10. Documentation and Training

Complete documentation shall be provided, including system architecture diagrams, network topology, IED configuration files, protection settings, communication matrices, FAT/SAT reports, and operation manuals. Training shall be provided for operators and maintenance personnel, including hands-on training at site.

11. Tentative SAS architecture:



INDICATIVE ARCHITECTURE OF SAS

Technical Specification No - A08
Energy Management System (EMS)

1. Scope of Energy Management System

The Energy Management System (EMS) shall be a centralized and integrated system for continuous monitoring, analysis, reporting, and management of electrical energy and power quality parameters of the 33/11 kV substation. The EMS shall acquire real-time and historical data from Power Quality Analysers, Trivector (ABT) Energy Meters, Multifunction Meters, and relevant data points from the Substation Automation System (SAS). The scope of work shall include system design, supply, installation, configuration, integration, testing, commissioning, documentation, training, and provision for future expansion of the EMS without requiring major hardware or software modifications.

2. Objectives of the EMS

The EMS shall provide comprehensive visibility of energy flow within the substation and shall enable accurate energy accounting, monitoring of demand, identification of losses, and assessment of power quality. The system shall support operational decision-making, regulatory compliance, performance benchmarking, and long-term planning. The EMS shall be capable of generating automated reports for operational staff, management, and statutory authorities and shall support secure local as well as remote access.

3. Standards and Compliance

The EMS hardware, software, and communication interfaces shall comply with the latest applicable standards including IEC 61850 for integration with SAS, IEC 62053 and IEC 61557 for energy and power quality measurement, IEC 61000-4-30 Class A for power quality analysis, IEC 60870-5-104 and Modbus TCP/IP for communication, IEEE 1459 for power definitions, and IEC 62351 for cybersecurity. Any deviation from the specified standards shall be clearly stated by the bidder.

4. System Architecture Philosophy

The EMS shall be based on a modular and layered architecture comprising a field measurement layer, a communication and data acquisition layer, an EMS server and analytics layer, and a presentation and reporting layer. The architecture shall be open, scalable, and interoperable, allowing seamless addition of new meters, feeders, or substations in the future. The system shall be designed to avoid vendor lock-in and shall support integration with higher-level enterprise or cloud-based energy management platforms.

5. Field Measurement Devices

Power Quality Analysers installed at selected 33 kV and 11 kV feeders or incomers shall be of Class A accuracy and shall measure and record voltage, current, frequency, harmonics, total harmonic distortion, voltage dips, swells, interruptions, flicker, unbalance, and transients. Trivector (ABT) Energy Meters shall be provided for energy accounting at 33 kV incomers and shall measure active, reactive, and apparent energy

along with maximum demand and time-of-day data. Multifunction Meters installed in 33 kV, 11 kV and LT switchgear panel shall be provided for auxiliary loads and feeders to measure electrical parameters such as voltage, current, power, energy, power factor, and frequency. All meters and analysers shall support remote data acquisition and time-stamped data storage.

6. Communication and Data Acquisition

All field devices shall communicate with the EMS using open and standard communication protocols such as Modbus TCP/IP, IEC 61850, or IEC 60870-5-104 as applicable. Communication shall be Ethernet-based using industrial managed switches. Provision shall be made for protocol gateways where legacy devices with serial communication are used. The communication network shall be logically segregated using VLANs to ensure reliable and secure data transmission.

7. EMS Server and Software

The EMS server shall be an industrial-grade or rack-mounted server hosting the EMS application software, real-time database, historical data historian, analytics engine, and reporting modules. The EMS software shall provide real-time dashboards, energy flow visualization, feeder-wise and transformer-wise energy accounting, load profiling, power quality analysis, alarm and event management, and loss calculation. The system shall support multi-user access with role-based permissions and shall allow future deployment in redundant or virtualized environments.

8. Reporting and Analytics

The EMS shall provide configurable and automated report generation facilities. Reports shall include daily, monthly, and annual energy consumption reports, maximum demand reports, load profile analysis, power quality compliance reports, harmonic analysis reports, and exception or alarm reports. Reports shall be exportable in standard formats such as PDF, Excel, and CSV and shall be schedulable for automatic generation and distribution.

9. Local HMI and User Interface

A local EMS Human Machine Interface (HMI) shall be provided in the substation for operators and engineers. The HMI shall be web-based and accessible through standard browsers. It shall provide graphical dashboards, trend analysis, alarm views, and report access based on user roles and access privileges.

10. Cloud Connectivity and Future Expansion

Provision shall be made for secure transmission of selected EMS data to a cloud or centralized enterprise platform for advanced analytics, centralized monitoring, and long-term data storage. Cloud connectivity shall be optional and enabled through secure firewall and VPN mechanisms. The EMS shall be designed to support future expansion such as addition of new meters, feeders, renewable energy sources, energy storage systems, or integration with multiple substations without requiring system replacement.

11. Cybersecurity Requirements

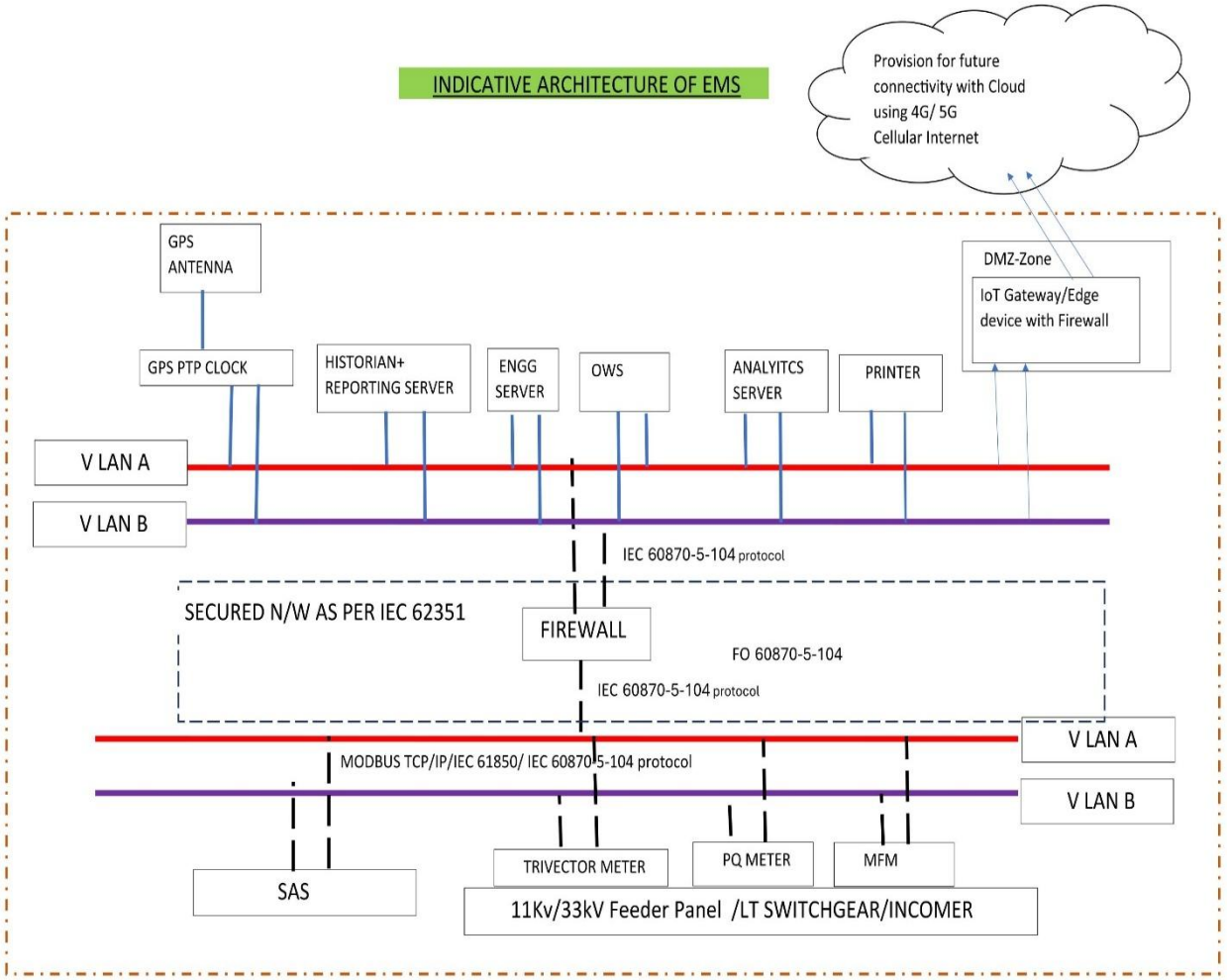
The EMS shall incorporate cybersecurity measures in accordance with IEC 62351 and applicable utility cybersecurity policies. This shall include deployment of an industrial firewall between the EMS network and external networks, role-based access control, encrypted communication, audit logs, system event logging, and controlled access to configuration and firmware updates.

12. Testing, Commissioning, and Documentation

The bidder shall be responsible for complete testing and commissioning of the EMS, including communication testing with all meters, data accuracy validation, report verification, cybersecurity checks, and integration testing with the SAS. Complete documentation including system architecture drawings, communication diagrams, configuration details, user manuals, and training material shall be provided. Training shall be imparted to operation and maintenance personnel.

The bidder shall also arrange a training demo for the operators at site to understand the know-how of the system.

15. Tentative architecture:



TECHNICAL SPECIFICATION NO - A09
ASSET MONITORING SYSTEM (AMS)

1.0 The contractor shall design, supply, install, test, and commission a comprehensive Asset Monitoring System (AMS) for continuous condition monitoring and health assessment of critical electrical equipment installed within the E-House substation. The system shall be capable of monitoring the operational condition and performance of key assets including power transformers, 33 kV and 11 kV switchgear panels. The AMS shall acquire real-time operational data from intelligent electronic devices (IEDs), protection relays, and dedicated sensors installed on equipment. Typical parameters to be monitored shall include transformer winding and oil temperature, transformer loading, insulation condition indicators, busbar temperature, cable termination temperature, humidity within the E-House, and other relevant environmental conditions. The system shall provide continuous monitoring to detect abnormal operating conditions at an early stage and enable predictive and condition-based maintenance of electrical assets.

2.0 The Asset Monitoring System shall be microprocessor-based and modular in design, allowing integration with the substation automation system. Communication between sensors, IEDs, relays and the AMS platform shall be through open and widely accepted industrial communication protocols such as IEC 61850, Modbus TCP/IP or equivalent, ensuring seamless interoperability with protection relays and control systems. The AMS shall provide real-time status monitoring, alarm and event generation, historical data logging, trending of asset parameters, asset health index calculation, and diagnostic tools for maintenance planning.

3.0 The AMS HMI and software shall provide centralized visualization, monitoring, and analysis of all connected substation assets through an industrial-grade workstation located in the E-House control room. The HMI shall display the substation single-line diagram with real-time status, measurements, and alarm indications for monitored equipment including transformers, switchgear at 11 KV and 33 KV. The software shall support real-time data acquisition, alarm and event management, historical data logging, and parameter trending for key operational parameters such as temperature, loading, humidity, and equipment status. The system shall allow configurable alarm thresholds, event recording with time stamping, and generation of basic operational and maintenance reports. The HMI software shall support multi-user access with role-based permissions and provide secure remote monitoring capability. The system shall be supplied as part of an integrated solution from reputed manufacturers

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TECHNICAL SPECIFICATION NO – A10
CYBER-SECURITY

1.0 The communication system and cyber security shall be designed, integrated in the substation with adherence to the following standard or regulation:

a) Central Electricity Authority (Technical Standards for Communication System in Power System Operation) Regulations, 2020

2.0 **The cyber security shall adhere to the followings:**

(1) All users and control centers 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.

3.0 The OT system shall comply with IEC 62443 cyber security standard for Industrial Automation and Control Systems, including but not limited to:

- IEC 62443-3-3 (System security requirements)
- IEC 62443-4-2 (Technical security requirements for components)

Following minimum areas where cyber security need to be implemented are as follows:

a) Hardened OT network (inclusion of Firewalls and Managed Ethernet switches)
b) Network segmentation (logical and physical)
c) Security patch management
d) Centralized log monitoring
e) USB port control

4.0 The server shall be of latest Windows version and loaded with reputed Antivirus software.

5.0 Industrial grade firewall shall be installed between OT network and external networks.

6.0 Unauthorized USB devices shall be disabled or controlled through security policy.

7.0 All configuration changes shall be logged and traceable.

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TECHNICAL SPECIFICATION NO – A11
AUTOMATIC POWER FACTOR CONTROL PANEL (APFC) PANEL

A. SCOPE:

I. This Scope covers supply, installation, testing and commissioning of HT Automatic Power Factor Control Panel (APFC) to be integrated in a 3 Phase, 50 Hz system at 11 KV system voltage. APFC panel shall be installed inside E-House. Accordingly, Heat Generating components like Capacitor bank of the APFC shall be installed outside while control panels shall be installed inside E-house.
All necessary civil work required for the installation of capacitor banks are covered under this scope.

II. The equipment and it's components covered under this specification shall comply with all the latest applicable statutory rules, regulations and relevant IS.

III. Any other component, accessories, safety features not specifically stated in this specification but necessary for trouble free and safe operation of the equipment shall deemed to be included in the scope.

B. STANDARDS:

- ✓ IS 13925 : Capacitor .
- ✓ IS 3156:Residual Voltage Transformer.
- ✓ IS 5553: Series Reactor
- ✓ Any other component as per relevant IS.

All IS/IEC shall be read with latest amendments in vogue on the date of technical bid opening.

C. Technical particulars:

Vendor shall design the APFC panel considering the following system parameters:

a) Operating Voltage: 11 kV
b) Earthing System: Neutral Grounding Resistor
c) Maximum Load expected: 3 MW
d) Lowest pf recorded: 0.79 lagging
e) Average pf recorded: 0.84- 0.86 lagging
f) Desired pf: 0.99 to Unity
g) Various type of existing load:

(i)VFD motor (6.6 kV, 575 kW)
(ii) UPS
iii) 450 HP motor, 3.3 kV, DOL starting
iv) Rooftop Solar panel (Future addition)

Cable entry provision shall be from the bottom of the APFC panel.

D. ENCLOSURE:

1. The APFC Panel shall have industrial CRCA enclosure of thickness not less than 2 mm free standing and compact in size. Ground clearance of bottom most part of APFC Panel should not be less than 150 mm.

2. Outdoor capacitor banks shall be suitable for outdoor installation with minimum IP-54 protection and appropriate anti-corrosive treatment.

3. Enclosure door shall be interlocked with main Isolator to de-energise capacitors before door can be opened.

4. It shall have two separate earthing terminals on two diagonally opposite corner for earthing of enclosure.

I. The bidder shall carry out a detailed system study based on the site conditions, existing and future loads, harmonic sources, and operating philosophy of the plant. The complete responsibility of correct sizing, configuration, detuning and protection coordination of the APFC system shall rest with the bidder. Any additional components required to ensure safe, reliable and resonance-free operation of the APFC system shall be deemed included in the quoted scope.

II. Point of Common Coupling (PCC) shall be the 11 kV bus where APFC is connected.

III. Considering the presence of VFDs, UPS systems, DOL motors and future rooftop solar inverters, the APFC system shall be designed to avoid parallel and series resonance under all operating conditions. The bidder is encouraged to propose a suitable detuned capacitor bank configuration with appropriate series reactor percentage, supported by:

(a) Harmonic analysis / calculation
(b) Detuning frequency selection rationale
(c) Compliance with applicable harmonic limits (IEEE-519 / IEC)
(d) Any deviation from standard detuned reactor practice shall be technically justified and submitted for approval.

IV. The bidder shall recommend an optimum step combination to:

(a) Achieve target power factor of 0.99 to unity at the PCC
(b) Avoid over-compensation during light load or high solar generation
(c) Minimise hunting and frequent switching

Switching devices and control logic shall be suitable for back-to-back switching, frequent operations, and smooth capacitor energisation.

V. The APFC system shall be designed to remain stable with future rooftop solar integration, including but not limited to:

(a) Prevention of leading power factor
(b) Blocking or shedding of capacitor steps during low load / high solar

conditions

(c) Provision for logic or interface expansion, if required in future

VI. Bidders are encouraged to offer value-added features that enhance:

(a) Equipment life
(b) Operational reliability
(c) Ease of maintenance
(d) Remote monitoring / diagnostics
(e) Energy efficiency

Any such value addition shall be clearly highlighted in the technical offer without impacting compliance to this specification.

VII. The APFC Controller automatically switches on/off the required number of capacitor banks in steps by continuously sensing and giving signal to switching devices. The capacitor steps shall be designed by supplier as per system requirement to achieve power factor near unity.

VIII. The APFC Panel shall have the following minimum components:

(a) Power capacitor units.
(b) Vacuum Contactor
(c) Series reactors for harmonic detuning and limitation of
(d) inrush current.
(e) Auto Manual selection.
(f) Residual Voltage Transformer.
(g) HRC fuses with striker
(h) Automatic Power factor controller
(i) Audio-visual indicator of various fault conditions.
(j) Off Load Isolator.
(k) Smooth Start/Stop sequence.
(l) Safety interlocks such as door interlocks with off load
(m) isolator & door locking mechanism with special type keys.
(n) Adequately rated Potential and Current Transformer.
(o) Remote monitoring components
(p) Protective Relays
(q) Measuring devices.
(r) Cable entry outlets through going boxes.
(s) Insulated Busbar

IX. Control and auxiliary supply shall be derived from station auxiliary supply. Voltage and redundancy philosophy shall be specified by the bidder.

X. The APFC Panel shall be painted after suitable treatment with one coat anti-corrosive paint and two coats of synthetic enamel paint of approved shade.

XI. The capacitor bank should be supplied with interconnection between units of capacitor and phase connection.

XII. Capacitor units shall be provided with arrangement of discharge resistors for quick discharge of the bank after the capacitor is disconnected from the supply source to reduce residual voltage to less than 50 volts within 5 Minutes of switching off.

XIII. The Capacitor element shall be wound from high purity annealed Aluminium foil , low loss capacitor paper and Polypropylene film (to have mixed dielectric of paper and polypropylene film), vacuum dried and impregnated under vacuum with non-toxic , non-PCB oil to ensure uniform film distribution and high ionization limit. The basic unit shall be hermetically sealed in suitable container.

XIV. Each capacitor element shall be provided with built in fuse so as to isolate the faulty element if it becomes defective. In addition to this easily replaceable HRC fuses of well known standard and made preferably of striker PIN indicator type single phase capacitor unit shall be provided.

XV. Measuring instrument shall be provided:

(a) KWH Meter
(b) PF Meter
(c) KW Meter
(d) Ammeter, Voltmeter and Selector Switch.

XVI. The bidder shall recommend suitable protection philosophy for:
(a) Individual capacitor steps
(b) Overall capacitor bank
(c) Control and auxiliary circuits

Protection coordination shall ensure selective isolation of faulty units without unnecessary tripping of the entire APFC system. APFC shall have the following protection:

(a) Overvoltage protection Relay
(b) No Volt protection relay
(c) Unbalance protection Relay
(d) Overcurrent and Earth fault protection to cover the faults in the capacitor unit and its controlling circuit breaker.
(e) Microprocessor based fast acting type APFC Relay
(f) Capacitor overtemperature / reactor thermal protection

XVII. Inspection:

The functionality of the equipment will be tested and checked by representative from OIL at OEM's workshop. Item will be cleared for dispatch only after the approval of OIL's representative.
OEM/supplier shall notify OIL a minimum of 15 days prior to inspection.

XVIII. The following documents must be uploaded at the time of bid submission:

(a) An attested copy of Type Test Report as per relevant IS from CPRI/NABL Accredited labs /Govt Approved test house of the capacitor bank of same or higher voltage rating.

XIX. The following documents must be submitted at the time of supply:

(a) An attested copy of manufacturer's test certificate covering all routine tests as per relevant IS of all the offered Capacitor banks /capacitor, Series Reactor, RVT, Relays etc.
(b) Copy of GTP, GA drawing, circuit diagram etc. with each set of APFC Panel.

GTP-8: HT APFC Panel (11 kV System)

Parameter	Specified Requirement	Bidder's Remark
1. GENERAL DETAILS		
System Type	HT Automatic Power Factor Correction (APFC) Panel	
Scope	Design, Supply, Installation, Testing & Commissioning	
Installation Location	Control Panel inside E-House, Capacitor Bank outside	
System Voltage	11 kV	
System Frequency	50 Hz	
Earthing System	Neutral Grounding Resistor (NGR)	
Applicable Standards	IS 13925, IS 3156, IS 5553, relevant IS/IEC	
2. SYSTEM DESIGN PARAMETERS		
Maximum Load	3 MW	
Minimum Power Factor	0.79 lagging	
Average Power Factor	0.84 – 0.86 lagging	
Desired Power Factor	0.99 to Unity	
Load Type	VFD, UPS, Motors, Solar (future)	
3. CAPACITOR BANK		
Type	HT Capacitor Bank (Outdoor)	
Capacitor Standard	IS 13925	
Bank Configuration	Step-wise (Automatic switching)	
Detuning Reactor	Provided (as per IS 5553)	
Residual Voltage Device	Provided (as per IS 3156)	
Switching Device	Vacuum Contactor / Circuit Breaker	
Protection	Overvoltage, Overcurrent, Unbalance	
Discharge Time	As per IS standards	
4. CONTROL PANEL (INDOOR)		
Type	Microprocessor-based APFC Controller	
Mounting	Indoor, Floor/Panel Mounted	
Degree of Protection	IP54	
Control Mode	Automatic & Manual	
PF Control Logic	Intelligent step switching	
Display	Digital PF, kV, kVAR, current	
Alarm Indication	Visual & audible	
5. APFC CONTROLLER FEATURES		
Power Factor Measurement	Real-time	
Step Switching	Automatic	

No. of Steps	To be designed by vendor	
Switching Delay	Adjustable	
Harmonic Handling	Detuned system	
Communication	Modbus / IEC (if required)	
6. PROTECTION FEATURES		
Over Voltage Protection	Provided	
Under Voltage Protection	Provided	
Over Current Protection	Provided	
Harmonic Protection	Provided	
Unbalance Protection	Provided	
Capacitor Protection	Individual step protection	
7. HARMONIC & REACTOR DETAILS		
Reactor Type	Detuned Reactor	
Tuning Factor	Typically 5.67% / 7% (to be finalized)	
Harmonic Mitigation	Suitable for VFD loads	
8. CABLING & INSTALLATION		
Cable Entry	Bottom Entry	
Control Cabling	In bidder scope	
Power Cabling	In bidder scope	
Civil Work	Included for capacitor bank installation	
9. TESTING & COMMISSIONING		
Factory Tests	As per IS/IEC	
Site Testing	Required	
Functional Test	PF improvement verification	
Performance Guarantee	PF ≥ 0.99	
10. DOCUMENTATION		
GA Drawing	Required	
SLD	Required	
Calculation Sheet (kVAR sizing)	Required	
O&M Manual	Required	
Test Certificates	Required	
11. Warranty & SUPPORT		
Warranty	As per tender (12–18 months typical)	
After Sales Support	Required	
12. DEVIATIONS		
List of Deviations	To be clearly indicated	

TECHNICAL SPECIFICATION NO – A12.1
BATTERY CHARGER AND BATTERY BANK

1.0 Scope

The battery bank and battery charger system for the E-House based 33/11 kV substation shall be designed, engineered, supplied, installed and commissioned by the contractor/supplier to provide a reliable DC power supply for protection, control, tripping, closing, annunciation and SCADA circuits of the substation. The DC system shall ensure uninterrupted supply to all essential loads in the event of failure of the AC auxiliary supply. The design of the DC system, including sizing of the battery bank, rating of the battery charger and calculation of DC loads, shall be carried out by the contractor/supplier based on the actual DC load requirement of the substation and shall be submitted to the Owner/Engineer for review and approval prior to implementation.

2.0 Applicable Standards

The battery charger and battery bank system shall comply with the latest applicable provisions of the Central Electricity Authority (CEA) technical standards and relevant Indian and international standards such as IEC and IS for stationary batteries and battery chargers. All equipment supplied shall be suitable for substation applications and designed for safe, reliable and continuous operation under the prevailing site conditions.

3.0 DC System Voltage

The station DC system voltage shall be 110 V DC. The DC system shall supply power to protection relays, circuit breaker tripping and closing circuits, control circuits, indication and annunciation systems, SCADA/RTU equipment and other essential auxiliary loads associated with the operation of the 33/11 kV substation.

4.0 Battery Bank

The battery bank shall consist of Valve Regulated Lead Acid (VRLA) stationary batteries suitable for substation applications. The battery bank shall be sized to provide a minimum autonomy of three (3) hours in the event of loss of AC auxiliary supply. Battery sizing shall be carried out by the contractor considering the continuous DC load, intermittent loads such as circuit breaker tripping and closing operations, battery ageing factor, temperature correction factor and an adequate design margin. The battery bank shall be complete with all necessary accessories including inter-cell connectors, terminal covers, insulated supports, battery racks and required cabling.

5.0 Battery Mounting and Installation

The batteries shall be mounted on robust, corrosion-resistant steel racks suitable for indoor installation. The racks shall be designed to safely support the battery weight and shall provide adequate spacing to allow inspection, testing and maintenance of the battery cells. Adequate clearance shall be maintained between battery rows and from

the floor to facilitate ventilation and maintenance activities.

6.0 Battery Charger

The battery charger shall be a microprocessor-based automatic battery charger designed for continuous operation in substation applications. The charger shall be capable of supplying the total DC load while maintaining the battery bank in a fully charged condition. The charger rating shall be adequate to supply the connected DC load and simultaneously recharge the battery bank following discharge.

To ensure reliability of the DC supply system, two (2) battery chargers of 100% capacity each (2 × 100%) shall be provided. Both chargers shall be capable of independently supplying the full DC load and charging the battery bank. One charger shall normally operate in service while the other shall remain on standby, and the system shall be designed to allow automatic or manual changeover between chargers.

7.0 Charger Operating Modes

The battery charger shall operate in the following modes as per standard industry practice:

8.0 Float Mode:

Under normal operating conditions, the charger shall operate in float charging mode to maintain the battery bank in a fully charged condition while supplying the connected DC load.

9.0 Boost Mode:

Following battery discharge, the charger shall automatically switch to boost charging mode to recharge the battery bank at a higher charging rate. After completion of the charging cycle, the charger shall automatically revert to float mode to prevent overcharging and ensure long battery life.

10.0 Charger Features and Protection

The battery charger shall include features such as automatic voltage regulation, current limiting, soft start facility, low ripple output suitable for sensitive protection and control equipment, and temperature compensation where applicable. Adequate protection shall be provided against over-voltage, short circuit, reverse polarity and other abnormal operating conditions. The charger shall also provide necessary alarms and indications for monitoring purposes.

11.0 DC Distribution System

A suitable DC distribution arrangement shall be provided to distribute power from the battery and charger system to various protection, control and auxiliary loads of the substation. The DC distribution board shall include incoming feeders from the charger and battery bank, DC protection devices such as MCBs or MCCBs, monitoring facilities and provisions for future feeders. All alarms and status signals from the DC system shall be available for annunciation and integration with the substation control or

SCADA system.

12.0 DC Earth Fault Detection

The DC system shall be provided with a DC earth fault detection scheme to continuously monitor insulation between the DC system and earth. The system shall generate visual and audible alarms in the event of earth faults occurring on either the positive or negative pole of the DC system. The earth fault monitoring system shall facilitate early detection and rectification of insulation failures in the DC circuits.

11.0 Battery Monitoring System

A suitable battery monitoring system shall be provided to monitor the health and performance of the battery bank. The system shall monitor key parameters such as battery voltage, charging current and overall battery condition. Necessary alarms and indications shall be provided for abnormal conditions. Provision shall also be made for integration of battery monitoring signals with the substation control or SCADA system where required.

12.0 Battery Room Requirements

A separate battery room shall be provided within or adjacent to the E-House for installation of the battery bank. The room shall be designed with adequate ventilation to prevent accumulation of gases generated during battery operation. Proper ventilation arrangements, adequate lighting and sufficient working space for maintenance activities shall be provided. The flooring shall be suitable for battery installation and resistant to electrolyte spillage.

13.0 Environmental Conditions

All equipment associated with the battery bank and charger system shall be suitable for operation under the environmental conditions expected at the installation site, including high ambient temperature and humidity. The equipment shall be adequately tropicalized and suitable for indoor installation in an E-House environment.

14.0 Testing and Commissioning

The battery charger and battery bank shall undergo routine factory tests as well as site acceptance tests prior to commissioning. These tests shall include verification of charger operation in float and boost modes, protection functionality, battery installation checks and overall system performance verification. The system shall be commissioned only after successful completion of all tests and approval by the Owner/Engineer.

15.0 Design Responsibility

The contractor/supplier shall be fully responsible for the detailed design and engineering of the DC system, including preparation of battery sizing calculations, DC load schedule, charger rating calculations, cable sizing and protection coordination. All design documents and calculations shall be submitted to the Owner/Engineer for review

and approval prior to manufacturing and installation.

GTP-9: Battery Charger for 110 V DC Substation System

Sl. No.	Parameter	Specified Requirement	Bidder's Offer
1	Equipment Type	Battery Charger	
2	Application	33/11 kV Substation DC System	
3	System DC Voltage	110 V DC	
4	Charger Configuration	2 × 100% (Redundant)	
5	Charger Type	Microprocessor-based, Automatic	
6	Charging Modes	Float & Boost Mode	
7	Rated Output Voltage	110 V DC (Nominal)	
8	Rated Output Current	As per load & battery sizing	
9	Input Supply	415 V AC, 3 Phase, 50 Hz	
10	Input Frequency Variation	±5%	
11	Float Voltage	~120–125 V DC (adjustable)	
12	Boost Voltage	~135–140 V DC (adjustable)	
13	Voltage Regulation	±1% or better	
14	Current Limiting Feature	Provided	
15	Ripple Content	≤ 2% (or as per IEC)	
16	Efficiency at Full Load	≥ 90%	
17	Metering	Voltage, Current, Ah, Status	
18	Indications	Healthy, Trip, Mode, Fault	
19	Protections Provided	Over-voltage, Over-current, Short circuit, Reverse polarity	
20	DC Earth Fault Detection	Provided	
21	Cooling Method	Natural / Forced Air	
22	Enclosure Protection	IP42 / IP54	
23	Mounting Type	Floor / Wall Mounted	
24	Communication Interface	Modbus / IEC 61850 (optional)	
25	Operating Temperature	0°C to 50°C	
26	Relative Humidity	Up to 95% (non-condensing)	
27	Compliance	IEC / IS / CEA Guidelines	

	Standard		
28	Make and Model	To be specified by bidder	

TECHNICAL SPECIFICATION NO – A12.2
UPS & BATTERY BANK

1. Scope of Supply

The scope of this tender shall include the design, engineering, manufacture, testing at works, supply, transportation, unloading, installation, commissioning, testing and performance proving of a complete Uninterruptible Power Supply (UPS) system along with associated battery bank for a 33/11 kV substation. The UPS system shall be supplied under LSTK (Lump Sum Turnkey) mode and shall be fully integrated with the substation electrical and control systems. The system shall cater to all critical AC loads of the substation including protection relays, control and relay panels, SAS/RTU, communication equipment, annunciation systems and other essential loads. All items necessary for complete and reliable operation of the UPS system, whether specifically mentioned or not, shall be deemed to be included in the scope of supply.

2. System Configuration and Redundancy

The UPS system shall be of online, double conversion type, suitable for continuous operation under substation conditions. The system shall be designed with full 100% redundancy (N+1 configuration) such that failure, isolation or maintenance of any single UPS module, inverter, control circuit or cooling fan shall not result in interruption of power supply to the connected loads. The UPS shall support parallel operation with automatic load sharing among modules. Static bypass and manual maintenance bypass arrangements shall be provided to ensure uninterrupted power supply during abnormal operating conditions or maintenance activities.

3. UPS Rating and Battery Bank Design Philosophy

The bidder shall be fully responsible for determining the appropriate UPS kVA rating and battery bank capacity based on the connected load details, duty cycle and required autonomy. The bidder shall carry out detailed load assessment during the engineering stage, considering present load, future expansion margin of at least 20%, and diversity factor. Battery sizing calculations shall be submitted, clearly indicating the number of cells, Ah capacity, discharge characteristics and backup duration. The offered system shall be adequately rated to meet the specified autonomy under worst-case operating conditions. The battery system shall be suitable for the required DC voltage level.

4. Electrical Characteristics of UPS System

The UPS system shall be suitable for operation from a 415 V AC, three-phase, 50 Hz utility supply with permissible voltage and frequency variations as per relevant standards. The UPS output shall be either 230 V AC single phase or 415 V AC three phase, as required by the connected load, with tight voltage regulation under steady-state and transient conditions. The output frequency shall be maintained within ±0.1% in free-running mode. The output waveform shall be sinusoidal with total harmonic distortion not exceeding 3% for linear loads and 5% for non-linear loads. Overall AC-to-AC efficiency of the UPS system shall be not less than 92% at rated load.

5. Overload Capability and Protection Features

The UPS system shall have adequate overload capacity to support temporary load surges without interruption. The system shall be capable of sustaining at least 125% rated load for a minimum duration of ten minutes and 150% rated load for a minimum duration of ten seconds. Comprehensive protection shall be provided against input overvoltage and undervoltage, output overload and short circuit, inverter faults, battery deep discharge, overtemperature and internal component failures. All protections shall operate automatically with proper annunciation and logging.

6. Bypass Arrangement

The UPS system shall be provided with an automatic static bypass to transfer the load to the bypass source in case of inverter failure, overload or abnormal conditions, without interruption to the load. In addition, a manually operated maintenance bypass shall be provided to enable complete isolation of the UPS system for maintenance purposes while maintaining uninterrupted power supply to the load. Transfer to and from bypass shall be seamless and synchronized.

7. Battery Bank and Accessories

The battery bank shall be of industrial grade, suitable for UPS applications, and shall be either VRLA type as offered by the bidder. Batteries shall be mounted on corrosion-resistant racks or housed in dedicated battery cabinets. The battery charging system shall support float and boost charging modes with temperature compensation to enhance battery life. Adequate DC protection in the form of MCCBs or fuses shall be provided close to the battery bank. The battery system shall be designed for reliable operation under substation environmental conditions.

8. Monitoring, Indications and Communication

The UPS system shall be equipped with a microprocessor-based monitoring and control system. A front-mounted LCD display shall be provided for real-time indication of system status, input/output parameters, battery condition, alarms and faults. The system shall have event and fault logging with date and time stamping. Potential-free contacts shall be provided for remote alarm annunciation and integration with the substation SAS system. Communication facilities using standard industrial protocols such as Modbus or SNMP shall be provided.

9. Mechanical Construction and Environmental Conditions

The UPS and associated panels shall be floor-mounted, indoor type, with robust sheet steel enclosures. The degree of protection shall be minimum IP41. The system shall be suitable for operation at ambient temperatures ranging from 0°C to 50°C, with no derating required up to 40°C, and relative humidity up to 95% non-condensing. Cooling shall be by forced air with redundant fans to ensure reliability. All components shall be adequately rated for continuous duty in substation environments.

10. Standards and Quality Requirements

The UPS system and battery bank shall comply with the latest applicable IEC, IEEE and IS standards, including IEC 62040 for UPS systems and IEC 60896 for batteries. The manufacturer shall have a proven track record in the design and supply of industrial UPS systems for power utilities, substations or similar critical infrastructure. The manufacturing facility shall be ISO 9001 and ISO 14001 certified. Type test certificates and routine test reports shall be submitted for approval.

11. Warranty and After-Sales Support

The complete UPS system shall be covered by a comprehensive warranty of not less than twenty-four months from the date of commissioning. Batteries shall be covered by manufacturer's warranty as per standard practice. The bidder shall also indicate availability of AMC and service support after the warranty period, with response times suitable for critical substation applications.

GTP-10: UPS & Battery Bank

A. UPS SYSTEM

Sl. No.	Description	Purchaser's Requirement	Bidder's Guaranteed Value
1	Type of UPS	Online, Double Conversion UPS	
2	Application	33/11 kV Substation – Critical Loads	
3	Installation Mode	Indoor, Floor Mounted	
4	System Configuration	N+1 Redundant (100% Redundancy)	
5	Rated UPS Capacity (kVA)	To be designed by bidder	
6	Number of UPS Modules	As required for N+1 configuration	
7	Input Voltage	415 V AC ±10%, 3 Phase	
8	Input Frequency	50 Hz ±6%	
9	Output Voltage	230 V AC (1-Ph) / 415 V AC (3-Ph)	
10	Output Frequency	50 Hz ±0.1% (Free running)	
11	Output Voltage Regulation	±1% (Steady State)	
12	Output Waveform	Pure Sinusoidal	
13	Output THD (Linear Load)	≤ 3%	
14	Output THD (Non-linear Load)	≤ 5%	
15	Overall Efficiency (AC–AC)	≥ 92% at rated load	
16	Overload Capacity	125% for ≥10 min, 150% for ≥10 sec	
17	Static Bypass	Provided	
18	Maintenance Bypass	Provided	
19	Parallel Operation Capability	Yes	
20	Transfer Time to Bypass	Seamless / No Interruption	
21	Degree of Protection	Minimum IP41	
22	Cooling System	Forced Air with Redundant Fans	
23	Display & Indications	LCD with Metering & Alarms	
24	Alarm & Event Logging	With Date & Time Stamping	
25	Communication Interface	Modbus / SNMP / Equivalent	

26	Potential Free Contacts	Provided for SAS	
27	Ambient Temperature	0°C to 50°C	
28	Relative Humidity	Up to 95%, Non-condensing	
29	Applicable Standards	IEC 62040 / Relevant IS	
30	Make & Country of Origin	Bidder to specify	

B. BATTERY BANK

Sl. No.	Description	Purchaser's Requirement	Bidder's Guaranteed Value
1	Battery Type	VRLA / Ni-Cd (Industrial Grade)	
2	Battery Application	UPS Backup for Substation Loads	
3	Nominal DC Voltage	110 V DC / 220 V DC (As applicable)	
4	Backup Time	As specified / Designed by bidder	
5	Battery Capacity (Ah)	To be designed by bidder	
6	Number of Cells	To be designed by bidder	
7	Battery Arrangement	Rack / Cabinet Mounted	
8	Charging Mode	Float & Boost Charging	
9	Temperature Compensation	Provided	
10	Battery Protection	DC MCCB / Fuse	
11	Battery Enclosure	Acid Resistant / Powder Coated	
12	Battery Standard	IEC 60896 / Relevant IS	
13	Battery Warranty	As per OEM Standard	

C. WARRANTY & SERVICE

Sl. No.	Description	Purchaser's Requirement	Bidder's Guaranteed Value
1	UPS Warranty	Minimum 24 Months	
2	Battery Warranty	OEM Standard	
4	Service Support	OEM / Authorized Service	
5	AMC After Warranty	To be Quoted Separately	

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TECHNICAL SPECIFICATION NO – A13.1
CABLES-HT CABLE

1. SCOPE:

The specification covers the design, testing, supply and delivery in proper packed condition of 3 core, Aluminium Conductor, Cross-linked polyethylene (XLPE) insulated, FRLS, PVC sheathed, armoured, screened Power Cables.

2. LOCATION: Moran Power Station, Oil India Limited, PIN-785669, Charaideo, Assam, India

3. SYSTEM DETAILS:

a.	Line Voltage (kV)	11kV/33kV
b.	Highest System Voltage (kV)	12kV/36kV
d.	Frequency	50Hz
e.	Neutral	Effectively earthed
f.	Short circuit level (KA)	22.77kA, 31.8kA/ 22.5kA, 45kA

4. STARDARDS:

4.1 The cable shall conform to the following standards :

a. IS 7098 Part 2 : 1985 XLPE insulated PVC sheathed cables For working voltages from 3.3 kV up to and including 33 kV.
b. IS 5831 : 1984 PVC Insulation and Sheath of electric Cables.
c. IS 8130:1984 Conductors for insulated electric cables and flexible cords.
d. IS 613:1984 Copper rods and bars for electrical purposes.
e. IS 3975:1988 Mild steel wires, formed and tapes for armouring of cable. IS 10810:1984 Method of tests for cables.
f. IS:10810 – 1984, Methods for test for cables
g. IEEE-383:1974 Standard for type test of class IE electric cables, field splices, and connections for nuclear power generating stations.
h. ASTM-D2843,1993 Standard test method for density of smoke from burning or decomposition of plastics.
i. ASTM-D2863, 1991 Standard test method for measuring minimum oxygen concentration to support candle - like combustion of plastics (oxygen index).

j. NEMA-WC5,1992 Thermoplastic Insulated Wire and cable for the transmission and distribution of Electrical Energy.
k. IEC:754 (Part-1):1994 Test on gases evolved during combustion of electric cables - Determination of the amount of halogen acid gas evolved during combustion of polymeric materials taken from cables.
l. IEC:332 (Part I):1993 Test on electric cables under fire conditions. Test on a single vertical insulated wire or cable.
m. IS 3961(Part II):1967 Recommended current rating for cables PVC insulated and PVC sheathed heavy duty cables.
n. IS 10418:1982 Drums for electric cables.

4.2 The cable, joints, outdoor and indoor termination and their accessories and fittings may conform to other Indian and/or equivalent standards or important publications to improve upon their performance but shall not fall short of the requirement of this specification. The tenderer shall clearly indicate such standards in their offers. Details of the termination kit is as follows:

Type of Kit	Voltage Grade	Indoor	Outdoor
End Termination Kit	33 kV	5	4
	11 kV	22	2
Straight Through Termination kit	11 kV	3	

5. ELECTRICAL CHARACTERISTICS & PERFORMANCE:

5.1 General Requirements:

(i) All cables shall be suitable for high ambient, high humid tropical climatic conditions. Cables shall be designed to withstand the mechanical, electrical and thermal stresses under the unforeseen steady state and transient conditions and shall be suitable for the proposed method of installation.

(ii) Conductor shall be of uniform, of good quality, free from defects Aluminium. Insulation shall be Cross Linked Polyethylene (XLPE).

(iii) For 33 kV and 11 kV cables, conductor screen and insulation screen shall both be extruded, semi-conducting compound and shall be applied along-with XLPE insulation in a single operation by triple extrusion process. Method of curing for 33 kV cable shall be "Dry curing/ gas curing" only, whereas for 11 kV cables it shall be "Dry curing/ gas curing / Steam curing".

(iv) Extruded Semi-conduct screening and metallic screening of copper tape shall be generally as per IS 7098 (Part-II) with latest amendments. The semi conducting compound shall be suitable for the operating temperature of the cable and compatible with the insulating material.

(v) The insulation screen shall be an extruded layer of black semi-conducting compound and continuously covers the whole area of insulation. The semi-conducting screens should be effectively cross linked to achieve 90 ° C cable rating. The contact surface between insulation and insulation screen shall be smooth and free from protrusion and irregularities.

(vi) The interface between insulation and insulation screen shall be free of any voids. Insulation screen shall be strippable type.

(vii) The metallic screen shall consist of a layer of copper cable applied in helical form.

5.2 TECHNICAL REQUIREMENTS

Technical parameters of the cable shall be as follows:

Sl No	Particulars	Unit	11 KV	33kV
1	Rated voltage	KV	6.35/11	19.0/33
2	Type of insulation	-	XLPE	XLPE
3	Core	-	Three	Three
4	Armoured / Unarmoured	-	Armoured	Armoured
5	Material of Conductor		Material to IS: 8130, H4 Grade Aluminium	Material to IS: 8130, H4 Grade Aluminium
			Conductor, Stranded compacted Circular	Conductor, Stranded compacted Circular
6	System	-	11 KV Earthed	33kV Earthed
7	Highest System Voltage	KV	12	36
8	Material	-	Stranded Aluminium	Stranded Aluminium
9	Voltage Grade	KV	6.35/11 KV	19.0/33 KV
10	Conductor Size	Sq. mm	3x240	3x300
11	Shape of Conductor		Circular	Circular
12	Minimum no. of wires in the conductor	mm	30	61

13	Nominal dimension of Al. round wire	mm	3.15 mm [for 3x240sq mm]	3.15 mm[for 3x300sq mm]
14	Nominal thickness of XLPE insulation sheath	mm	3.6	8.8
15	Approx overall cable diameter	mm	77.00	105
16	Current Rating			
A	In ground at 20°	A	338 A	380
B	In air	A	415 A	472
17	Max. Conductor Temp	oC	90 ºC at max. Continuous current	90 ºC at max. Continuous current
18	Short Ckt.Current for 1 second duration	KA	22.6KA-for240 sq mm,	28.35 kA for 300 sq.mm
19	Power Frequency Withstand Voltage	KV rms	28	70
20	Lightning Impulse Withstand Voltage	KV rms	75	170
21	Max. DC resistance of conductor at 20 Deg. C	oh m/ km	0.125 for 3Cx240sqmm	- 0.1 for 3CX300 sq.mm
22	Max. AC resistance of conductor at 90 Deg. C	oh m/ km	0.160 for 3Cx240sqmm	0.13 for 3CX300 sq.mm
23	Reactance of cable at normal frequency (Approx)	oh m/ km	0.085 for 3Cx240sqmm	0.10 for 3CX300 sq.mm
24	Electrostatic capacitance at normal frequency	µF	0.41 for 3Cx240sqmm	0.22 for 3CX300 sq.mm
25	Max. Permissible emergency overload temp. at 25% overload to 100 hrs. per year or 500 hrs. in life of cable	oC	130 oC for one hour	130 oC for one hour
26	Continuous Withstand Temperature	oC	90oC	90oC
27	Short Circuit	oC	250oC for one hour	250oC for one hour

	withstand Temperature			
28	Conductor Screening	:	Extruded, cross linked, semi-conducting compound	Extruded, cross linked, semi-conducting compound
29	Insulation	:	XLPE of thickness, 3.6 mm (Nominal)	XLPE of thickness, 8.8 mm (Nominal)
A	Insulation Screening	:	Annealed copper 0.06 mm (minimum) thick tape lapping as metallic part.	Combination of black extruded semi- conducting tape as the non-metallic part and annealed copper 0.06 mm (minimum) thick tape lapping as metallic part.
30	Inner Sheathing	:	Black extruded PVC, Type ST-2 compound for 33 KV and wrapped PVC tape for 11 KV as per ISS. Min. Thickness for 11kV 3Cx240sqmm shall be 0.70mm and minimum 2.5 mm for 3C*300 sq.mm	Extruded Polyvinyl Chloride or Halogen free compound
31	Armouring	:	Galvanized steel strips/wire for 11 KV (3 core) as per IS.	Round Wire Armour made of non-magnetic material
32	Overall Sheathing	:	Coloured PVC, type ST-2 compound to IS: 5831, extruded for both Min. Thickness for 11kV 3Cx240sqmm shall be 2.68mm	coloured PVC, Type ST-2 compound conforming to IS 5831 Thickness 3.5 mm for 3C*300 sq.mm
33	Approx. length of cable in a Drum	:	500 metres with a tolerance of ± 5% (for 3 core, 11 kV),	250 metres ± 5% (for 3 core, 33 kV)
34	End Sealing	:	Heat Shrinkable Caps.	Heat Shrinkable Caps.

A	Max. 'Tan-delta' at room temp. At nominal phase to neutral voltage (Uo):	:	0.004	0.004
B	Max. Increment of 'tan-delta' between 0.5 Uo to 2 Uo at room temp:	:	0.002	0.002
35	Partial discharge value	:	5 Pc (Maxm.) at 1.6 Uo.	5 Pc
36	H.V. Tests between Conductors & Screen/Armour	:	35kV (rms) as per IS 7098-2	63KV (rms) as per IS 7098-2
37	Oxygen Index	:	Min 29 (as per ASTMD 2863)	Min 29 (as per ASTMD 2863)
38	Acid Gas Generation	:	Max 20% (as per IEC 754-1)	Max 20% (as per IEC 754-1)
39	Smoke Density Generation	:	60% (As per ASTMD 2843)	60% (As per ASTMD 2843)
40	Flammability Test	:	As per Swedish Chimney test	As per Swedish Chimney test

6. CABLE CONSTRUCTION:

6.1 XLPE underground cable is to be manufactured in continuous catenaries process at controlled elevated temperature and pressure in inert atmosphere with use of suitable materials for XLPE semi-conducting, insulation and XLPE screen. The inner and outer semi- conducting sheaths and main polyethylene insulation between the sheaths are to be simultaneously extruded during the Triple Extrusion Process of manufacturing and main insulation of the Cable is to be extruded unified. The XLPE Cables in this specification does not have any metal sheath and the short circuit rating of the cable will depend on the conductivity and continuity of the strands of the armour wires, which shall be ensured by guarding against corrosion.

6.2 CONDUCTOR SCREENING

A semi-conducting cross-linked polyethylene (XLPE) screening shall be extruded over the conductor to act as an electrical shield which together with elimination of the so called "Strand Effect" prevents to a great extent air ionization on the surface of the conductor.

6.3 INSULATION:

The main insulation of the Cable shall be extruded unfilled, chemically cross-

linked polyethylene (XLPE) inert gas cured satisfying the requirement of ISS: 7098 (Part- II).

6.4 INSULATION SCREEN:

The insulation screen shall be an extruded layer of black semi-conducting compound and continuously covers the whole area of insulation. The semi-conducting screens should be effectively cross linked to achieve 90deg C cable rating. The contact surface between insulation and insulation screen shall be smooth and free from protrusion and irregularities. The insulation screen shall be constructed as per clause no. 29 of the specific technical parameters. The metal screen shall eliminate tangential stress electrostatic field surrounding the conductor and uniform electrical stress in the insulation.

The semi conducting polyethylene (XLPE) screen shall be extruded over the main poly ethylene-insulating wall to prevent partial discharge at the surface of the insulation. The copper tape shall be wrapped over the semi conducting tape or extrusion as mentioned earlier for 3 core cables. The metal screen so formed around the cores shall be in contact with one another as the cores are laid up at triangular configuration. For single core cable, Aluminium wires armouring shall constitute the metallic part of insulation screen. Conductor screening, insulation and insulation screening shall be extruded in triple extrusion processes so as to obtain continuously smooth interfaces.

6.5 The mechanical and chemical properties of the materials for semi conducting screens are much more important than their electrical properties, but for obtaining the high overall degree of electrical properties of an E.H.V. cable, the inner and outer semi conducting, sheaths and the main polyethylene insulation between the sheaths shall be simultaneously extruded during the manufacturing, process known as “triple extrusion”. The advantages are:

i) The partial discharge level at the surface of the insulation is brought to a minimum.

ii) There will be no displacement of the semi conducting screen and insulation during expansion and contraction due to load cycles and bending.

iii) The semi conducting screens are easily removable during joining and termination operations.

6.6 LAYING UP:

The phase identification of the cores shall be either by colour or numerals as per I.S.S. for 3 core cables only.

Core Colour	**Numeral**
Red	1
Yellow	2
Blue	3

The screen cores shall be laid up with interstices filled with PVC fillers and taped with binder tape as to obtain a reasonably circular cable.

6.7 INNER SHEATH:

The cable core shall be supplied with bedding of PVC (Inner sheath) in the form of extruded PVC sheath for 33 KV cables. Wrapped PVC tapes shall be used for 11 KV cable. thickness as per relevant IS.

6.8 ARMOUR:

The cable shall be wire armoured /steel strip in case of 33KV and wire/strip armoured for 11 KV, three core cables to ensure an adequate return path for the flow of fault current and also provide suitable mechanical protection. Steel wires/aluminium wire / steel strips of required size in requisite number shall be laid closely in the spiral formation to protect the circumference of the cable fully and to provide adequate cores section area for flow of maximum fault current within limits of specified temperature rise and duration of fault. Direction of the lay of the armour shall be opposite to that of the cable cores. Armouring shall be as per relevant IS and it shall have minimum 90% coverage.

6.9 OUTER SHEATH:

A reliable surving shall be necessary for maintaining conductivity of the armour particularly under corrosive condition in the form of jacket. Cable shall be therefore finished with extruded PVC over sheath of thickness.

The quality of PVC over sheath (jacket) shall be ensured for service reliability against moisture intrusion and shall confirm to type ST-2 of IS : 5831.It shall be of black colour PVC with Cable size and Voltage grade embossed on it. Sequential marking shall be at every 1 (one) Meter distance. Word "FRLS" shall also be embossed on it at every 5 (Five) meter distance

The sheaths shall be protected against white ants, vermin and termites by suitable, durable and reliable measures. The suppliers shall suggest suitable materials for use, in the event of damage to the over sheath to prevent the passage of moisture along the cable.

6.10 FRLS Properties: All cable shall be Flame Retardant, Low Smoke (FRLS) type. Outer sheath shall have the following properties –

a) Acid Gas Generation – Max 20% (as per IEC 754-1)
b) Smoke density rating: 60% (As per ASTMD 2843)
c) Flammability test - As per Swedish chimney test F3 as per SEN 4241475
d) As per IEC 332 part-3 (Category B)
e) Minimum bending radius shall be 10 D
f) Repaired cables shall not be acceptable.

6.11 Current Rating of Cables:

a) Normal current rating shall not be less than as specified in IS 3961. Vendor shall submit data in respect of all cables in the prescribed format.
b) Tables given de-rating factors for various conditions of cable installation including the following, for all types of cables shall be furnished.
   (i) Variation in ambient air temperature.
   (ii) Variation in ground temperature.
   (iii) Depth of laying.
   (iv) Cables laid in the ground - Cables laid in trench
   (v) Cables laid in ducts - Soil resistivity.
   (vi) Grouping of cables.

6.12 CABLE IDENTIFICATION:

The following shall be embossed on the outer sheath for the identification.

a) Manufacturer's Name or Trade Mark.
b) Voltage Grade.
c) Nominal section and material of conductors and number of cores.
d) Year of manufacture.
e) Inscription of length of cables at 1.0 mtr interval.
f) Name of purchaser OIL;
g) Marking "Power" shall be embossed throughout the length of the cable at 10 mtr spacing.
h) Type of insulation

6.13 XLPE sealing OF CABLE ENDS:

The cable ends of the cable in the wooden drum for delivery shall be sealed with heat shrinkable caps.

7. WOODEN DRUMS:

The cable shall be packed in non-returnable wooden drums. The following information shall be marked on each drum.

a) Drum identification number.
b) Manufacturer's name, Trade name / Trade mark, if any.
c) Nominal sectional area of the conductor of the cable.
d) Number of cores
e) Type of cable and voltage grade with cable code
f) Length of cable in cable drum
g) Direction of rotation of drum (by means of an arrow)
h) Appox. Weight: bare: gross:
i) Year and country of manufacture

j) Purchase order number
k) Date of delivery
l) Name of the purchaser.

Drum shall be proofed against attack by white ant or termite conforming to IS: 10418. The Drums may also be marked with ISI certificate mark, as applicable.

Safe pulling force:30 N/mm2 (for conductor).

8. Tests to be performed as per IS:7098 (part II)

The tenderer shall have to submit type test report along with the Bid. The Type test reports shall not be older than five years from the date of submission of Bid. Bidder will be disqualified for non-submission of type test reports.

(A) Type test of all the test mentioned below are to be made as per details given in IS:10810

a) Test on conductor
   i. Tensile test (For aluminium)
   ii. Wrapping test for aluminium
   iii. Resistance test.
b) Test for armoring wire strips.
c) Test for thickness of insulation and sheath.
d) Physical test for insulation.
   i. Tensile strength and elongation at break
   ii. Ageing in air oven.
   iii. Hot test
   iv. Shrinkage test.
   v. Water absorption (Gravimetric)
e) Physical tests for outer sheath
   i. Tensile strength and elongation at break
   ii. Ageing in air oven.
   iii. Shrinkage test.
   iv. Hot deformation
   v. Heat shock
   vi. Loss of mass in air oven
   vii. Thermal stability
   viii. Thermal Stability
f) Partial discharge test
g) Bending test
h) Dielectric power factor test
i. As a function voltage
ii. As a function of temperature

i) Insulation resistance (volume resistivity) test
j) Heating cycle test
k) Impulse with stand test
l) High voltage test
m) Flammability test

(B) The following test on screen cable shall be performed successfully on the same test sample of completed cable, not less than 10 m. in length between the test accessories.

a) PD test
b) Bending test followed by PD test
c) Di-electric power factor as function of voltage
d) Di-electric power factor as a function of temperature
e) Heating cycle test followed by Di-electric power factor as a function of voltage and PD test.
f) Impulse withstand test and
g) High voltage test as per para 30 of special technical parameters

If a sample fails in test (g) one more sample shall be taken for this test, preceded by test (b) and (e)

(C) Acceptance test : the following shall constitute acceptance test:

a) Tensile test (For aluminium)
b) Wrapping test for aluminium
c) Conductor resistance test
d) Test for thickness of insulation and sheath
e) Hot set test for insulation
f) Tensile strength and elongation at break test for insulation and outer sheath
g) PD test (Screen enables) only on full drum length
h) High voltage test, and
i) Insulation resistance (volume resistivity) test
j) Spark test on extruded un-insulated outer PVC sheath as per provision clause no 3.2 IEC standard (Publication no.229 of 1982)

(D) Routine test:

The routine test shall be carried out on all cables manufacturer in accordance with this specification. The following routine test shall be made on cable length as specified in ISS.

a) Conductor resistance test
b) Partial discharge test on full drum length
c) High voltage test
d) Any other test specified by OEM

(E) Inspection

a) All tests shall be performed in presence of OIL's representatives if so desired by the purchaser.
b) The contractor shall give at least 15 days advance notice for witnessing such tests.
c) Certified copies of all routine test carried out at work shall be furnished for the approval of the Purchaser.
d) The cable shall be dispatched from works only after receipt of Purchaser's written approval of shop test report.

9. Document to be submitted along with bid.

The following details for the cable shall be submitted with bid

(a) Manufacturers catalogue giving cable construction details and characteristics
(b) Cable current ratings for different types of installation inclusive of derating factors due to ambient temperature, grouping etc.
(c) Over-load characteristics of the cable without endangering the normal life and electrical quality of the insulation.
(d) Complete technical date of the cables.
(e) Type test certificate from government testing units/government authorized testing units with the quality assurance plan submitted by the firm, the offer shall be liable for rejection.

GTP-11: HT XLPE Power Cables, Terminations & Accessories (33 kV & 11 kV)

Sl. No.	Parameter	Specified Requirement	Bidder's Remark
1	Applicable Standards	ASTM-D2863, NEMA-WC5, IEC 754, IEC 332, IS 3961, IS 10418, IS 7098 (Part-II)	
2	Compliance	Latest amendments of IS/IEC	
3	Additional Standards	Equivalent standards allowed (not inferior)	
4	Installation Conditions	High temperature & high humidity (tropical)	
5	Cable Type	HT Power Cable	
6	Voltage Grade	33 kV / 11 kV	
7	Conductor Material	Aluminium	
8	Conductor Quality	Uniform, defect-free	
9	Insulation Type	XLPE (Cross Linked Polyethylene)	
10	Insulation Process	Triple extrusion	
11	Conductor Screen	Extruded semi-conducting compound	
12	Insulation Screen	Extruded semi-conducting compound	
13	Screen Application	Along with insulation in single process	
14	Semi-Conducting Compound	Suitable for operating temperature	
15	Insulation Screen Type	Strippable	
16	Interface Quality	Smooth, void-free, no irregularities	
17	Cable Rating Temperature	90°C	
18	Metallic Screen	Copper tape, helically applied	
19	Screening Standard	As per IS 7098 (Part-II)	
20	Curing Method (33 kV)	Dry curing / Gas curing	
21	Curing Method (11 kV)	Dry / Gas / Steam curing	
22	Fire Performance	As per IEC 332	
23	Halogen Emission	As per IEC 754	
24	Oxygen Index	As per ASTM-D2863	
25	Cable Drum	As per IS 10418	
26	Current Rating	As per IS 3961	
27	Mechanical Strength	Suitable for installation conditions	
28	Thermal Performance	Suitable for steady & transient conditions	
29	Electrical Performance	Suitable for system operation	
30	Termination Kit – 33 kV Indoor	Quantity: 5 Nos	

31	Termination Kit – 33 kV Outdoor	Quantity: 4 Nos	
32	Termination Kit – 11 kV Indoor	Quantity: 22 Nos	
33	Termination Kit – 11 kV Outdoor	Quantity: 2 Nos	
34	Through Joint Kit – 11 kV	Quantity: 3 Nos	
35	Termination Type	Heat shrink / Cold shrink	
36	Jointing Type	Straight through joint	
37	Accessories	All required fittings included	
38	Compatibility	Suitable for XLPE cables	
39	Installation	Indoor & Outdoor application	
40	Environmental Suitability	Tropical, humid conditions	
41	Safety Compliance	As per relevant IS/IEC	
42	Make of Cable	To be specified by bidder	
43	Make of Termination Kit	To be specified by bidder	
44	Deviations	To be clearly indicated	

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TECHNICAL SPECIFICATION NO – A13.2
LT CONTROL CABLE

1.0 **SCOPE:**

This specification covers, design, manufacture, testing at manufacturer's works, supply and delivery, free at Destination of ISI marked of 1.1KV grade PVC insulated armoured stranded heat resistant (HR), FRLS copper control cables as specified in quantity schedule to be used at sub-stations of OIL. Sizes of the LT control cable are:

i. 2C x 2.5 sq. mm
ii. 4C x 2.5 sq. mm
iii. 7C x 2.5 sq.mm
iv. 10C x 2.5 sq. mm

The Control Cables are required for the control, protection, instrumentation, auxiliary Power Supply. Following information shall be made available along with bid: manufacturer's literatures, drawings, instruction manuals to enable the purchaser to make an appraisal of the quality and suitability of the materials offered. Failure to comply with the provision may be sufficient reason to reject the bid.

2.0 **STANDARDS AND REGULATIONS:**

All materials shall comply with the applicable provisions of the latest edition of Indian Standards, Indian Electricity Rules, Indian Electricity Act and other applicable statutory provisions, rules and regulations.

The following standards would apply to the specification.

a) IS-1554 (Part-I) – PVC insulated heavy duty.
b) IS-8130-Conductors for PVC insulated Cables.
c) IS-3961 (Part-II) - Recommended current ratings for Cables.
d) IS-5831-PVC insulated and sheath of Electric Cable.
e) Other relevant standards for screening.

3.0 **CRITERIA FOR SELECTION OF CONTROL CABLES:**

a) Aluminium Conductor PVC insulated armoured power cables of 1.1 KV grade shall be used for various applications in switchyard area/control room.
b) For all control/protection/instrumentation purposes PVC insulated armoured control cables of minimum 2.5 sq.mm. size with stranded copper conductor shall be used.
c) AC input Cable to the Battery Charger shall be of PVC insulated, armoured, stranded Copper Cable. DC output Cables from the Charger as well as from the battery shall be of PVC insulated, armoured, stranded Copper Cable.
d) All connections for PT and D.C. Circuit to control and relay panel shall be made with not less than 2.5 sq. mm. copper stranded control cable.

e) All connections of CT circuits to control and relay panel shall be made with not less than 4 sq. mm. copper stranded control cable.
f) Separate cable shall be used for AC and DC.

4.0 TECHNICAL REQUIREMENTS / DESIGN CRITERIA:

4.1 The material of PVC insulated copper conductor shall be made from high conductivity copper rods complying with IS: 613

4.2 Cables shall be capable of satisfactory operation under Power Supply System frequency variation of + 5% and voltage variation of + 10%.

4.3 Wire before stranding shall be approximately circular in cross section, smooth, uniform in quality and free from scale, spills, splits and other defects. The conductor shall be clean; reasonably uniform in size, shape and its surface shall be free from sharp edges. Manufacturer shall ensure that not more than two joints are provided in any one of the single wires forming every complete length of conductor. Joints shall be brazed, silver soldered or electric or gas welded. No joints shall be made in the conductor after it has been stranded. Each Conductor shall consist of multi strand copper wire for 2.5sq.mm cross section. Conductor wire shall be stranded. The Cable shall be laid in ground or on ladder type traps or drawn in conduit in a hot, humid and tropical atmosphere. The trays may be over head, suspended or run in concrete trenches with removable covers.

4.4 1100 Volts Grade Heat Resisting (HR), FRLS Copper Cables suitable for use where the combination of ambient temperature and temperature rise due to load results in conductor temperature not exceeding 85 deg.C under normal continuous operation and 160 deg.C under short-circuit condition with stranded annealed copper conductor, HR PVC insulated, HR extruded PVC inner sheathed, round galvanized steel wire armoured (for multi core cable only) and overall HR extruded PVC sheathed shall generally conform to latest revision of IS:1554(Part-I). The cores shall be colour coded as per I.S. for easy identification.

4.5 Cables shall be suitable for laying in racks, ducts, trenches and underground. Cables shall be designed to withstand all mechanical, electrical and thermal stresses under steady state and transient operating condition.

5.0 CURRENT RATING:

The Cables will have current rating, derating factors for an ambient temperature. The current ratings shall be based on the maximum temperature at site for continuous operation at the rated current.

6.0 INSULATION:

The insulation of sheath shall consist of a compound based on one of the followings.

(a) Polyvinyl Chloride (PVC).
(b) Suitable co-polymers of which the major constituent shall be VinylChloride.

(c) The PVC insulated 1100V grade control cables shall be suitable for a maximum rated conductor temperature. The Insulation shall be extruded PVC to Type-A of IS
: 5831.

(d) The thickness of insulation, tolerance on thickness of insulation and insulation resistance of the material shall conform to IS:1554Part-I.

(e) The PVC material for insulation and outer sheathing shall have smooth finish. Armouring shall be of single layer of G.I. Steel Wires though enough to withstand mechanical stressed during handling and shall be resistant to action of oil, acid and alkali.

7.0 **OUTER SHEATH:**

An outer sheath shall be provided over armoring. The outer sheath shall be applied by extrusion. The outer sheath shall be so applied that it fits closely over armoring.

The outer sheath shall be of Type STI, PVC compounds conforming to IS: 5831. Outer sheath shall be Fire retardant type FR, CI. Minimum thickness of PVC outer sheath, Standard Colour and tolerance on thickness of armoured cables shall conform to Clause 14.4.2 of IS:1554 (Part-I).

8.0 **INNER SHEATH:**

For multi core armoured cables, the inner sheath shall be of extruded PVC. The inner sheath for common covering shall be of non-hygroscopes, fire retardant material and shall be softer than insulation. The inner sheath shall be so applied that fits closely on the laid up cores. Thickness of the inner sheath shall conform to Clause 12.3 of IS: 1554 (Part-I).

9.0 **ARMOURING:**

Armoring shall be applied over the inner sheath in case of multicore cables. The armour shall be galvanized round steel wires. Nominal diameter of round steel wires shall conform to Clause No.13.3 of IS:1554(Part-I).

10.0 **GUARANTEE:**

Electrical characteristics shall be guaranteed by the bidder. In case of failure of materials to meet the guarantee, OIL shall have right to reject the material. Guaranteed Technical Particulars are to be submitted by successful bidder during detailed engineering along with submitted drawings/documents. However format for submission of GTP shall be handed over to intending bidders at the time of sale of tender documents.

11.0 **DRUM LENGTH OF CABLES:**

11.1 The Cables shall be packed in non-returnable wooden drums. The wooden drums should be bearing distinguishing number with following information duly stencilled on the outer side of one flange.

a. Name of the Manufacturer.

b. Normal sectional area of the Conductor of the Cable.
c. Number of Cores.
d. Type of Cable & Voltage for which it is suitable.
e. Length of Cable in this drum.
f. Direction of rotation of Drum (an arrow)
g. Gross Weight.
h. Purchase Order No. & Date.
i. Year of Manufacture.
j. Property of OIL.
k. Date of Delivery.

11.2 Drums shall be proofed against attack by white ant and termite, Conforming toIS-10418- 1982.

11.3 The Cables shall be supplied in Drum lengths of 500m, which shall be subject to tolerance of not more than + 5% and the variation in the total quantity of cables due to tolerance in individual drum length shall be limited to+ 2.5% for all types of cable. Non- standard drum length shall not be acceptable. However, before packing the cables on Drums for dispatch, the successful bidders will be required to obtain *purchaser's approval.*

11.4 Embossing on the outer sheath of the Cable with marking "Name of Employer; IPDS" and length of the Cable in meters at suitable intermittent distance, preferably 1Mtr.should be done.

12.0 TESTS AT MANUFACTURER'S WORKS AND TEST CERTIFICATES:

12.1 Each type and size of cable shall comply with the requirements of routine test as per relevant Indian Standard.

12.2 All routine and Acceptance tests shall be carried out at the manufacturer's works on every lot of offered different type and sizes of cables as per relevant Indian Standards. Selection of samples for acceptance test as well as rejection and retesting shall be guided by relevant IS. The entire cost of acceptance and routine tests that are to be carried out as per relevant IS shall be treated as included in quoted price of control and power cable.. The contractor shall give at least 15 (fifteen) days advance notice to the OIL, intimating the actual date of inspection and details of all tests that are to be carried out.

13.0 TEST REPORTS AND TYPE TESTS:

Only type tested Control Cables are to be offered conforming to our technical specification, and relevant IS and IEC. Control Cables offered should be similar with ones on which type testing has been carried out as per relevant IS and IEC. Three sets of complete type test reports carried out in NABL accredited laboratory shall have to be submitted by successful bidder positively along with submission of bid. The submitted type test report shall proof that the type test have been carried out within five years from the date of submission of bid.

Each type test report shall comply the following information with test result

i) Complete identification, date and serial no.
ii) Method of application, Where applied, duration and interpretation of each test

GTP –12: 1.1 kV Copper Stranded Control Cable (FRLS, HR, Armoured)

Sl. No.	Parameter	Unit	2C x 2.5 sq.mm	4C x 2.5 sq.mm	7C x 2.5 sq.mm	10C x 2.5 sq.mm	Bidder Remarks
1	Manufacturer & Works Location	—					
2	Applicable Standards (IS 1554, IS 8130, etc.)	—					
3	Cable Type	—	FRLS, HR, Armoured	Same	Same	Same	
4	Voltage Grade	kV	1.1	1.1	1.1	1.1	
5	Conductor Material	—	Copper	Copper	Copper	Copper	
6	Conductor Size	sq.mm	2.5	2.5	2.5	2.5	
7	No. of Cores	—	2	4	7	10	
8	No. of Strands & Wire Dia	No./mm					
9	Insulation Type	—	PVC Type A	Same	Same	Same	
10	Insulation Thickness	mm					
11	Inner Sheath Material	—	PVC	PVC	PVC	PVC	
12	Inner Sheath Thickness	mm					
13	Armour Type	—	GI Round Wire	Same	Same	Same	
14	Armour Wire Size	mm					
15	Outer Sheath Material	—	FRLS PVC (ST1)	Same	Same	Same	
16	Outer Sheath Thickness	mm					
17	Overall Diameter	mm					
18	Current Rating – Ground (32°C)	A					
19	Current Rating – Duct	A					
20	Current Rating – Air (40°C)	A					
21	Short Circuit Rating (1 sec)	kA					

22	Conductor Resistance @ 20°C	Ohm/km					
23	Approx Weight	kg/km					
24	Standard Drum Length	m	500	500	500	500	
25	Max Operating Temp	°C	85	85	85	85	
26	Short Circuit Temp	°C	160	160	160	160	

TECHNICAL SPECIFICATION NO – A14 (NUMERICAL RELAYS)

1.0 SCOPE:

a) This specification covers design, manufacture, assembly, testing before supply, inspection, packing and delivery and other basic technical requirements in respect of microprocessor based protection and management relays for 33 kV and 11 kV feeders and for 33/11KV Power Transformers installed at various 33/11 kV sub-stations. The Relays supplied by bidder against this specification is required for vital installations where continuity of service is very important. The design, materials and manufacture of the equipment shall, therefore, be of the highest order to ensure continuous and trouble-free service over the years. The manufacturer has to design the schematics for protection and control of all equipment including monitoring indications, visual and audible alarm, inter locking schemes among different equipment. Any other requirement which are not specifically covered here but which are necessary for successful commissioning of the relays are also within the scope of the Contract.

b) The relays manufactured should conform to the relevant standards and of highest quality of engineering design and workmanship. The equipment manufactured shall ensure satisfactory and reliable performance throughout the service life.

2.0 Service Conditions:

a) System particulars:

Nominal system voltage	33 kV & 11 kV
Corresponding highest system voltage	36 kV & 12 kV
Frequency	50 Hz±3%
Number of phases	3
Neutral Earthing	11 kV earthed via NGR

3.0 Applicable Standards:

a) Unless otherwise specified all equipment and material shall conform to the latest IS/IEC applicable standards. Equipment complying with other internationally recognized standards will also be considered if it ensures performance equivalent or superior to Indian standards. In the event of supply of equipment conforming to any international / internationally recognized standards other than the standard listed below.

b) All the relays provided under the specification shall generally conform to the latest issues of the following:

a)	IS 12063/1987	Degree of Protection provided for enclosure of electrical equipment.
b)	IS 5/2004	Color for ready mixed paints & enamels.

c)	IS 3231 / 1986 & 1987	Electrical relays for power system protection
d)	IEC 60255	Numerical protection relay
d)	IS 8686/1977	Static Protective Relays
e)	IS 1248/2003	Indicating instruments
f)	IEC 61850 Edition I & II	Communication Protocol for RELAYs.
g)	IEC 62439	HSR& PRP
h)	IEEE 1588	Precision Time Protocol
i)	IEC 60068	HEC for PCBs.
l)	IS 375	Marking and arrangement for switchgear Bus
m)	IS 5578/1984	Marking of insulated conductors.

Table 1: List of standards applicable

4.0 GENERALREQUIREMENT OF NUMERICAL RELAYS:

a. The relay in general shall comply with the all the requirements mentioned in General requirements below. The following protections shall be provided to feeder and power transformers by numeric relays.

b. Numerical multifunctional combined microprocessor-based feeder protection and management relay will protect the 33 kV or 11kV feeders and 33/11kV transformers from all electrical and other faults along with reporting system, disturbance record for fault analysis. The manufacturer should comply with any special requirement or feature asked for retrofitting the relays. All numerical relays shall be provided with 'Relay Failure Annunciation contact" which must be extra from the output contact specific Relay in the detail technical specification.

c. The numerical relay must have an IEC 61850 Edition I & II. The Numerical relay must have PRP & HSR compliant dual redundant rear RJ45 port and process bus 9-2LE support for future upgradation.

d. The Mean Time To Repair(MTTR) of the offered relay shall be less than 30 mins facilitating quick replacement of faulty unit without disturbing majority of wirings.

e. The relays shall employ IPC [institute for interconnecting and packaging electronic circuits] Class 3 printed circuit boards i.e. IPC 610-3.

f. The relay shall have the facility to program the pickup threshold between 40 to 150 % of VDC independently per digital input to prevent the spurious pick up of binary during inputs DC earth fault condition and should be ESI 48- 4EB2 compliant.

g. The relays provided should comply with the international standards of NERC-CIP/BDEW for cyber security to provide protection against unauthorized disclosure, transfer, modification, or destruction of information and/or information systems, whether accidental or intentional.

h. All PCB used in relays should have harsh environmental coating as per standard IEC 60068 (HEC) to increase the particle repellence and thereby increasing the life of relay. RELAY shall be manufactured using lead- free components. The bidder must submit supporting documents regarding the conformity of the relevant standard in the offered relay. G3 certificate will be accepted as a proof of conformity for operation in the extreme environmental conditions.

i. The relay shall provide an operating range of -40°C to 60°C and be tested as per IEC 60068 for 16 Hours operation between -40°C to 85°C.

j. The relay shall have a USB/RS232/RJ45 communication port for connecting to a local PC/Laptop for setting and viewing the data from the relay. The relay must have either IEC 61850 + IEC 103 or IEC 61850+ Modbus with minimum two nos. redundant PRP or HSR compliant RJ45 communication port . Use of any type of converter is not acceptable.

k. The RELAY shall be provided with 1 set of common support software compatible with latest version of Windows which will allow easy uploading of settings of RELAY in addition to downloading of event, faults, disturbance records, measurements for trouble shooting purposes.

l. Manufacturer of relays should have their own SAS application so that they can provide easy system solution if required in future.

m. The manufacturer shall provide all necessary software tools along with source codes to perform addition of bays in future and for integration with SAS. These software tools shall be able to configure relay, add analog variable, alarm list, event list, modify interlocking logics etc. for additional bays / equipment which shall be added in future.

n. Relay parameterization should be accomplished with the front panel keys and display. Due to the numerous settings, this manual method can be somewhat laborious. To simplify programming and provide a more intuitive interface, set points can be entered with a PC/Laptop running Setup software should be provided with the relay so that the engineers can configure/upload/ Download the settings and Disturbance records without any hassles.

5.0 TYPE TESTS:

Offered relay must be type tested for the following tests:

S.N	Type Test	Test Specification
1	Performance test	
1.1	Measurement accuracy of characteristic quantity and specified time	IEC 60255-1
1.2	Limits of operating range of auxiliary energizing inputs and auxiliary	IEC 60255-1
	voltage dependence	
1.3	Limits of frequency range and frequency dependence	IEC 60255-1
1.4	Limits of ambient temperature and ambient temperature	IEC 60255-1

	dependence	
2	Rated burden requirement	
2.1	Measuring circuits	IEC 60255-1
2.2	Auxiliary circuits	IEC 60255-1
2.3	Signaling inputs	IEC 60255-1
3	Thermal requirements	
3.1	Maximum allowable temperature	IEC 60255-27
3.2	Limits of continuous and temporary thermal withstand and values of input energizing quantities	IEC 60255-27
3.3	Limits of short time thermal withstand value of input energizing quantities	IEC 60255-27
3.4	Limiting dynamic value	IEC 60255-6
4	Insulation test	
4.1	Insulation resistance measurement	IEC 60255-27
4.2	Dielectric test	IEC 60255-27
4.3	Impulse voltage withstand capability test	IEC 60255-27
4.4.	Protective bonding resistance test	IEC 60255-27
5	Power supply requirements	
5.1	Voltage dips to dc auxiliary voltage	IEC 60255-26
5.2	Interruptions to dc auxiliary voltage	IEC 60255-26
5.3	Ripple in dc auxiliary voltage	IEC 60255-26
5.4	Voltage dips to AC auxiliary voltage	IEC 60255-26
5.5	Interruptions to ac auxiliary voltage	IEC 60255-26
6	Environmental test	
6.1	Cold test	IEC 60068-2-1
6.2	Dry heat test	IEC 60068-2-2
6.3	Damp heat, cyclic	IEC 60068-2-30
6.4	Storage temperature test	IEC 60068-2-1 & 2
	Electromagnetic compatibility requirement	
7	Emission tests	
7.1	Radiated radio-frequency emission test	IEC 60255-26
7.2	Conducted radio-frequency emission test	IEC 60255-26
8	Immunity tests – enclosure	
8.1	Electrostatic Discharge test	IEC 60255-26
8.2	Radiated radio-frequency immunity test	IEC 60255-26
8.3	Power-frequency magnetic field immunity test	IEC 60255-26
8.4	Pulse magnetic field immunity test	IEC 61000-4-9
8.5	Damped oscillatory magnetic field immunity test	IEC 61000-4-10
9	Immunity tests- Port	
9.1	Immunity to conducted disturbances, induced by radio-frequency fields	IEC 60255-26
9.2	Fast transient disturbance test	IEC 60255-26
9.3	Slow Damped Oscillatory Waves Immunity test (1 MHz burst)	IEC 60255-26

9.4	Surge Immunity test	IEC 60255-26
9.5	Power frequency immunity test	IEC 60255-26
10	Contact performance	
10.1	Contact making/Breaking capacity test	
10.2	Continuous capacity	
11	Mechanical performance requirements	
11.1	Durability of relay operation	IEC 60255-6
11.2	Durability of plug-in relays	IEC 60255-6
11.3	Durability of relay setting controls	IEC 60255-6
11.4	Vibration response and endurance test	IEC 60255-21-1
11.5	Shock response and withstand test	IEC 60255-21-2
11.6	Bump test	IEC 60255-21-2
11.7	Seismic test	IEC 60255-21-3
12	IEC 61850 performance requirements	
12.1	Level A 1 certificate	
12.2	IEC 61850 Edition II Part 6,7-1,7-2,7-3,7-4 and 8-1	
12.3	IEC 61850-5 Edition 2 Performance class P1	

Type test reports for the above tests shall be submitted for verification of OIL along with bid. The type test reports should be either from CPRI, DNVGL & ERDA.

6.0 Training:

Suitable training to be imparted to OIL's persons on the following items:

a) Relay setting and parameterization

b) Relay configuration with respect to I/P, O/P and functional block for protection.

c) GOOSE configuration.

d) Configuration and Interfacing required for third party SCADA System Integration.

e) Diagnostic features for disturbance records.

7.0 **Inter-operability:** The offered relay and associated items shall be fully interchangeable and inter-operable with each other.

8.0 TECHNICAL REQUIREMENTS FOR NUMERICAL RELAY:

8.1 The following are the technical requirement of feeder protection relay

Sl. No.	Feature and Function	Technical requirement

1	Purpose and application	It is intended to automate the Switchgears specified in the scope of supply and use Communicable Numeric relays for Protection, Control, Metering and Status monitoring. This specification is based on the understanding that an integrated Automation System along with protections shall be provided and same shall have provisions for Integration with SAS system. All the feeders shall be remote controlled from OIL's control room And local console of the numerical relays. Numerical multifunctional combined Microprocessor based Feeder protection and management relay to protect the 33kV & 11 kV Feeder from all electrical and other faults along with reporting system, Disturbance record for fault analysis. Relay should be IEC 61850 compliant. Relay should have 4 CT input for O/C and E/F protection. There should be option for derivation of E/F internally.
2	Main Protection feature	1. Relay should have minimum Four group of setting. Setting group changeover required from digital status input. 2. Electrical over load protection with selectable IEC curves with three stages, first stage to be used as IDMT and second stage to be used as high set for short circuit protection and third stage for Definite Time. 3. Earth fault protection in two stages with IEC characteristics. First stage to be used as IDMT/Definite Time and second stage to be used as instantaneous elements. Earth fault element should be suitable for both CBCT and residual type CT connection. 4. One stage Negative phase sequence Protection with IEC Curves. 5. CB Fail Protection & time settable as per user 6. The relay should be immune to DC switching while carrying current i.e. no spurious trip should be generated if relay DC is made On and Off. 7. The relay should conform to the IEC255-4 or BS 142 for Inverse time characteristics. 8. he relay should have features to monitor for one stage broken conductor feature for alarm and trip by calculating I2/I1 and CB opening time 9. The relay should have inrush blocking feature. 10. The relay should have the current based thermal overload feature incorporated. 11. The relay should have cold load pick up feature to provide stability during start up after a long shut down, Cold load pick up (CLP) logic should work by either inhibiting one or more stages of the over current protection for a set duration or raising the over current setting of selected stages , for the cold loading period. 12. Trip circuit supervision: Relay shall have inbuilt Trip Circuit Supervision function for supervising minimum two nos. trip coil both during CB open and CB closed condition

		13. Fault Locator: The relay shall include a fault-locating algorithm to calculate the fault location with +/- 2.5 % accuracy for phase-to- phase and phase-to-earth faults in effectively and low-resistance earthed networks.
3	Processor feature	Relay shall be completely Numerical with protective elements having software algorithm based on sampling of Analog inputs. Sampling Rate of Analog Signal: The sampling rate should be 800Hz for 50 Hz signal or better for each analog channel. Hardware based measurements shall not be acceptable.
4	Operational Philosophy	The operation of Relay shall be possible both locally from the Switchgear and remote & Local Work station. The local position shall be displayed in remote / local workstation and remote operation shall be blocked if the switch is in Local. Clear control priorities shall prevent initiation of operation of a single switch at the same time from more than one of the various control levels and there shall be interlocks among various control levels. The priority shall always be with the lowest enabled control level. Relay accuracy shall not be affected by system frequency fluctuation.
5	Status/Optical Inputs/Digital inputs	1. Minimum 14 number binary inputs are required. 2. All binary inputs should be settable threshold voltage from 20 to 170 V DC. 3. Setting group is required to be changed with any binary input status. 4. Trip circuit supervision with BI or BO status 5. The Binary inputs shall be acquired by exception with 1ms resolution. Contact bouncing in binary inputs shall not be assumed as change of state. 6. Relay should have comprehensive self diagnostic feature with remote indication of relay failure and alarm shall be generated without tripping of circuit. 7. Provision of Testing relays output without any current injection. 8. No. of programmable LEDs - at least 9 nos. with latching option. 9. All the BI should be freely configurable.
6	Main measuring and reporting feature	All measurements should be in primary quantities. Minimum following displays are required in alpha numeric:- 1. Three phase (Positive sequence) current 2. Neutral (zero sequence) current 3. All the trips should have clear indication on the relay interface. 4. Three nos. of Fixed LEDs (for trip, Alarm, Relay available & Relay out of service) & minimum 9 nos. three colour programmable LEDs which can be assigned to any protection function for local annunciation. 5. Resetting should be selectable as hand reset or auto reset.

		6. The default relay LCD shall be user defined to display primary circuit loading.
7	Tools for Fault diagnostics	1. Fault record: The relay shall have the facility to store at least last 100 time-stamped fault records with information on cause of trip, trip values of electrical parameters. 2. Event record: The relay shall have the facility to store at least 1000 time stamped event records with 1ms resolution. 3. Disturbance records: The relay shall have capacity to store at least 20 sec disturbance record waveforms.
8	Memory and Recording Feature	1.The relay setting and programming should be stored in EEPROM so that during Aux. Power failure no data is lost. The last 5 fault DR records should be in flash memory and DR will not erase in case of DC supply fail for more than 2 days. 2.Relay should have event log, trip log and DR record. All logs should go in to history. 3.All tripping of relay should initiate DR in auto without extra binary input. Triggering of DR with binary input should be user configurable. 4. Should be able to record at least 10 fault records and 20 event records in flash memory. 5.Minimum 10 nos. of latest trip log with cause of trip should be stored in memory along with date and time stamping. The memory should not be lost with the switching off of DC. 6.The relay should have fault-recording feature with current waveform and Digital Input status. The fault waveform should consist of minimum four current waveforms of three phase current and zero sequence current and DI status. Triggering time for Pre and Post should have user selectable. This record should be in flash memory for minimum 7(seven) days even after switching off the DC supply.
9	Auxiliary Supply	Both 240 V AC and 110 V DC [- 25% to + 10%] 2 wire unearthed system. Necessary software shall be in-built for proper shutdown and restart in case of power failure. Auxiliary supply burden will be around 20Watt.
10	Rated CT/PT secondary	5/1 Amp(User selectable) , CTs used to be protection class
11	Rated frequency	50 HZ +/- 5%

12	Ambient condition	1. Operating ambient temperature upto 55Deg C. 2. Operating Humidity upto 93%. 3. Relay shall meet the requirement for withstanding electromagnetic interference according to relevant parts of latest IEC 60255-25. Failure of single component within the equipment shall neither cause unwanted operation nor lead to a complete system breakdown.
13	Module and Mounting	1. Relay should be flush mounted type. 2. Module to be preferably draw out type then it should have CT shorting facility of make before break type. 3. Mounting in switchgears located in non AC rooms. 4. Galvanic isolation between field connection and relay hardware should be there. 5.The relays should be housed in a robust metal case suitable for panel mounting conforming to IP 51 (Front face) and IP 20 in the rear side.
14	Watchdog and self monitoring	The relay should have facility to comprehensively monitor the healthiness of its circuits and components by own monitoring system. In case of any problem of hardware and software elements of the relay, the fault diagnosis information shall be displayed on the LCD and an alarm should be generated by one of the output contacts. The alarm as soft signal to be sent to SCADA system as well. Necessary support documentation explaining the self-diagnostic feature shall be furnished. Watch dog contact shall be provided in addition to required 14 BI, 10 BO (Relay supervision contact must be additional from 10 BO). All the BI & BOs shall be freely configurable. All binary inputs should be settable threshold voltage from 20…170 VDC.
15	Settings	As detailed in Clause No. 11 of Technical Specification
16	Relays Output	Minimum 10 number binary/digital output are required out of which 1. One potential free change over contact should be provided for start inhibit of relay. 2. All o/p contact should be freely programmable. 3.To enable fast direct tripping of the circuit breaker, the relay must have 2 optional high-speed binary outputs with an operate time of ≤ 2-3 ms. The binary output contacts shall be rated to make and carry 30 A for 0.5 s with a breaking capacity of ≥1 A (L/R<40 ms). 4. Rating of trip contacts. a) Contact durability>10K operation. b) 30 Amp make and carry for 0.5 sec for trip contact. c) Make and carry for trip contacts L/R<=50ms Rating of Alarm contacts.

		d) 8 Amp make and carry continuously (ac or dc).
17	Relay software and Man Machine Interface	1. The offered relay shall have a comprehensive local MMI (man- machine interface) for interface. It shall have the following minimum elements so that the features of the relay can be accessed and setting changes can be done locally. - At least 48 character alphanumeric backlit LCD display unit. - The LCD panel should be able to display graphical data such as at least 2 Configurable SLDs, vector diagram of instantaneous power. 2.Should have password protected key padlock. The password of the relay should of Level 4 to provide security to the setting parameters. 3.Tactile keypad for 4 navigation keys for browsing and setting the relay menu. 4. Necessary software for relay setting, retrieving DR, event log, trip log should be supplied by the Manufacturer. The License of the software is to be issued to APDCL for the entire lifespan of the relay. 5. Additional functions can be added to RELAY by software up- gradation and downloading this upgraded software to the relays by simple communication through PC. 6. Multiuser/Corporate license for installation on minimum 40 nos. Of PCs/Laptops.
18	Date and time	Date and Time stamping with faults and record. The clock should be powered from internal cell and should not require setting after every DC switching. The internal cell life shall be minimum 7 years. Time synchronization by SNTP and PTP. Via IEC61850 only. The relay must support IEEE 1588 v2 for high accuracy time synchronization in Ethernet based applications.
19	Lugs and terminators	All CT and PT terminals shall be provided as fixed (screwed) type terminals on the relay to avoid any hazard due to loose connection leading to CT opening or any other loose connection. Necessary amount of lugs should be supplied along with each relay for CT connection and control wiring.
20	Manuals, Drawings and Literature	1. The relays should be supplied with manuals with all technical and operating instructions. 2. All the internal drawings indicating the logics and block diagram details explaining principle of operation should be given at the time of supply. 3. Mapping details shall be submitted in IEC format.

21	Standard documentation per Relay, according to IEC 61850	1.MICS document (model implementation conformance statement). 2. PICS(protocol implementation conformance statement. 3. Conformance Test certificate from DNVGL/CPRI. 4. PIXIT document. All the above mentioned certificates shall be submitted. 5. ICD file 6. SCD file
22	Extendibility in Future	The Manufacturer shall provide all necessary software tools along with source codes to perform addition of bays in future and complete integration with SCADA by the User. These software tools shall be able to configure relay, add analog variable, alarm list, event list, modify interlocking logics etc. for additional bays/equipment which shall be added in future.
23	Lifespan	The supplier should mention following:- 1. Product maturity: The Manufacturer should mention the time period for which the product is in the market. 2. Expected product life shall be minimum 10 years and additional 10 years service support after obsolution notice if any. 3. Hardware/Firmware change notification process and Upgrades to be provided free of cost within the Guarantee period/5 years whichever is later, if needed. 4. Lifespan of standard tools and processes for relay configuration, querying and integration.
24	Standards	As detailed in Table 1: List of Standards Applicable Clause No. 3.2 of Technical Specifications.
25	Communication Port	1. The relay should have Latest IEC 61850 Edition 2 or better Communication Protocol. 2. Relay should support PRP(parallel Redundancy protocol) as per IEC 62439-3. 3. Functioning of Relay shall not hamper to fault occurring any interconnected relay. 4. The Relays must have two fiber-optic Ethernet ports with HSR and PRP-1. 5. The relay shall have a USB/RS232/RJ45 communication port for connecting to a local PC/Laptop for setting and viewing the data from the relay. Both IEC 103 (to communicate with existing SAS) and IEC 61850 must be available simultaneously in single relay with minimum two nos. redundant communication port (FO or RJ45). Use of any type of converter is not acceptable.

26	Name Plate and marking	Each RELAY shall be clearly marked with manufacturer's Name, type, serial no. and electrical rating data. Name plates shall be made of anodized aluminium with white engraving on black surface.
27	Guarantee	Relays will be guaranteed for the period of sixty six months from the date of last receipt at respective T&C Divisions.
28	Performance	Any problem in the said period should be attended free of charge inclusive of repair/replacement of relays/ component (both H/W, S/W).
29	Type Test	As detailed in the table for type tests in Clause No. 5 of Technical Specifications.
30	Inter-operability test	As detailed in Interoperability Test and Demonstrations in Clause No. 7 of Technical Specifications.

8.2 PROTECTION SCHEMES FOR NUMERICAL OC/EF RELAY NON- DIRECTIONAL:

The following protection functions must be available in RELAYs for feeder protection in Substation of OIL

33 kV switchgear	
Incomer Feeder	Minimum 50, 50N,51,51N,51V, 24, 59,27, 81, 87B,
Outgoing Feeder (Transformer)	Minimum 50, 50N,51,51N,51V, 24, 87T, 59,27, 81, 87B, BR,
Bus coupler	Minimum 50, 50N,51,51N,51V, 24, 59,27, 81, 87B,

11 kV switchgear	
Feeder	Protection
Incomer Feeder	Minimum 50, 50N,51,51N,51V, 87T, 64 REF, 59,27, 81, 87B, BR
Bus coupler	Minimum 50, 50N,51,51N,51V, 87B
Tie feeder	Minimum 50, 50N,51,51N,51V, 87B, 67N
Station Transformer Feeder	Minimum 50, 50N,51,51N, PRV, OTI, WTI
Solar +BESS	Minimum 50, 50N,51,51N,
APFC	Minimum 50, 50N,51,51N,
Outgoing Feeder	Minimum 50, 50N,51,51N,

a) Timed and instantaneous phase and earth fault protection Non-Directional):

Relay should have minimum 3 CT input for Non Directional Over Current and 1 CT input for Earth Fault. Relay should have timed and instantaneous phase fault in all three phases and earth fault with minimum 3 independent stages (IDMT & DT) for OC & EF protection and should support wide range of ANSI/IEC/IEEE curves and with adjustable reset time.

The relay must have three-stage phase overcurrent protection (67) with voltage memory and positive and negative-sequence polarization.

The relay must have three-stage earth-fault protection (67N) with selectable negative and zero-sequence polarization. I0 and U0 shall be derived either from the phase voltages and currents or from the measured neutral current and residual voltage.

b) Inrush blocking feature:

Second harmonic blocking feature for over current and earth fault protection to be provided.

c) Thermal Overload:

The device should incorporate a current-based thermal characteristic, using

fundamental load current to model heating and cooling of the protected plant. The element should be settable with both alarm and trip stages.

d) Negative sequence over current feature:

One stage of negative sequence over current protection with DT & IDMT feature (user selectable) to be provided.

e) Broken conductor (BC)protection (Phase Discontinuity Protection):

The relay should have features to monitor for single stage broken conductor. The offered relay shall have inbuilt algorithm to detect low magnitude fault current to detect downed conductor. The relay should be support two stages – BC Alarm & BC trip and functions by calculating I2/I1. This function shall work for 50 Hz system with efficiently grounded or isolated neutral. The Broken Conductor protection feature shall be incorporated in such a way that the relay operates in case of mal-operation of single phase switchgear, operation of fuses, open jumper or broken conductor.

f) Circuit breaker failure protection:

CB fail protection function by incorporating CB fail timer & criteria for resetting CBF timer should be user selectable.

g) Cold load pick up feature :

To provide stability during start up after a long shutdown, cold load pickup (CLP) logic should work by either:

I. Inhibiting one or more stages of the over current protection for a set duration.

II. Raising the over current settings of selected stages, for the cold loading period.

h) Trip circuit supervision: Relay shall have inbuilt Trip Circuit Supervision function for supervising minimum two nos. trip coil both during CB open and CB closed condition.

i) The relay in addition to the above basic function should also provide the following functions:

i. The relay shall have the facility to latch the trip output relay.

ii. Relay shall have facility to control the CB in local/remote/ combination of both.

j) It should have test mode facilityto test the relay operation during commissioning / maintenance activity which allows:

I. Secondary injection testing to be performed on the relay without operation of the trip contacts.

II. Binary inputs /output status monitoring

III. Binary output contacts test and LED tests.

k) Fault Locator: The relay shall include a fault-locating algorithm to calculate the fault location with +/- 2.5 % accuracy for phase-to-phase and phase-to-earth faults in effectively and low- resistance earthed networks.

l) Fuse Fail Supervision: The offered relay should have fuse failure supervision that detects failures between the voltage measurement circuit and the relay. The failures are detected either by the negative sequence-based algorithm or by the delta voltage and delta current algorithm. Upon the detection of a failure, the fuse failure supervision function activates an alarm and blocks voltage-dependent protection functions from unintended operation.

9.0 Measurements:

All measurements should be in primary quantities. The default relay LCD shall be user defined to display primary circuit loading. As a minimum, the relay should measure and display in alpha-numeric the following standard quantities:

a) Phase currents

b) Neutral currents - derived and measured

c) Thermal state

d) Positive, negative and Zero sequence current

e) Ratio of negative to positive sequence current

f) Breaker operation counter

g) Breaker trip counter for Earth Fault

h) Breaker trip counter for Over Current.

i) Breaker operating time

j) Resetting of display should be selectable as hand reset or auto reset.

k) Three Phase Neutral Voltage (Only for Dir OCEF protection Relay)

l) Frequency & Power Factor (Only for Dir OCEF protection Relay)

m) Power & Energy Measurement (Only for Dir OCEF protection Relay)

10.0 Settings:

Setting range of offered relays shall comply the below Table, bidder to confirm each range in below table, and this document to be submitted with GTP.

Sl No	Protection Function: (Numerical Feeder protection Relay)	Bidder To Confirm Yes/No
1	Three Phase Non Directional Over Current Protection	
	Plug Setting	
	Low Set Stage - 0.05 5.00 × In, in steps 0.01	
	High Set Stage - 0.10 40.00 × In in steps 0.01	
	Instantaneous Stage - 1.00 40.00 × In in steps 0.01	
	Time Setting	
	Time multiplier Low Stage and High Set stage 0.05 15.00 in step 0.01	
	Operate delay time For Low stage and high stage 40...200000 ms in step 10	
	Operate delay time For Inst Stage 20...200000 ms in step 10	
	Operation accuracy: Current: ±1.5% of the set value or ±0.002 × In Voltage: ±1.5% of the set value or ±0.002 × Un Phase angle: ±2°	
2	Three Phase Non Directional Earth Fault Protection	
	Plug Setting	
	Start value Low Stage - 0.010 5.000 × In, in step 0.005	
	High stage - 0.10 40.00 × In, in step 0.01	
	Inst Stage - 1.00 40.00 × In, in step 0.01	
	Time Setting	
	Time multiplier Low and High stage - 0.05 15.00 in step 0.01	
	Operate delay time Low & High stage - 40...200000 ms in step 10	
	Inst Stage - 20...200000 ms in step 10	
	Operation accuracy: ±1.5% of the set value or ±0.002 × In	
	Negative-sequence overcurrent protection:	

3	Start value 0.01 5.00 × In, in step 0.01	
	Time multiplier: 0.05 15.00 in step 0.01	
	Operate delay time: 40...200000 ms in step 10	
4	Broken Conductor protection:	
	Start value : 10...100% in step 1	
	Operate delay time : 100...30000 ms in step 1	
	Min phase current: 0.05 0.30 × In in step 0.01	

11.0 PROTECTION OF 33 KV POWER TRANSFORMERS:

(i) In addition to compliance with the 'General requirements of numerical relays' as detailed above, differential protection (87) for two winding transformer shall have the following features:

(ii) The relay shall be very fast in operation. The relay shall be inherently stable for external through fault conditions without affecting the speed of operation for internal faults. The relay shall have stabilized differential protection (87T) with two independently settable stages. The biased low-set stage shall provide fast fault clearance while remaining stable when high currents are passing through the protected zone, which increases current measurement errors. The instantaneous high-set stage shall provide very fast clearance of severe internal power transformer faults with a high differential current regardless of their harmonics content. The operate time of the instantaneous stage shall be less than 25ms.

(iii) The relay is equipped with six phase-current inputs and one neutral-current input. The rated level of the current inputs is 1/5 A and selectable in the relay software.

(iv) The relay shall provide biased differential protection with triple slope tripping characteristics with faulty phase identification / indication. The range for the differential pick-up shall be from 0.1 to 2.5 pu. Its operating time shall not exceed 30 ms at 5 times rated current. The relay shall have either a built in facility / software of ratio and phase angle correction or necessary interposing auxiliary current transformers of universal type, shall be provided in the respective panel. The necessary adaptation to the current ratios and vector groups shall be made using software (with internally settable adaptation for CT ratio matching and vector group) and all current inputs (1A and 5A) shall allow direct connection to the main CT, i.e. no interposing current transformers for matching transformer group and main CTs ratio shall be required.

(v) The relay shall have 'no gap' detection technique to detect light CT saturation on a per phase basis. The no gap detection technique unblocks the low set differential element during light CT saturation, allowing the low set differential element to trip faster.

(vi) The relay shall be provided with 2nd harmonic restraint or any other inrush proof feature to ensure stability during inrush condition and to prevent operation due to magnetizing inrush current when the transformer is charged either from HV or LV side. The second harmonic blocking threshold shall be programmable one and it should be possible to deactivate the 2nd harmonic restraint feature. But this feature shall not affect the speed of operation for internal fault. The ratio of the second harmonic component to the fundamental wave for the differential currents of the measuring system shall serve as the criterion for this feature.

(vii) The differential protection functions shall be provided with a 2nd harmonic blocking to avoid tripping at magnetizing inrush when the transformer is energized either from the HV or LV-side and with a 5th harmonic restraint to avoid tripping at over-excitation. It shall be possible to set the blocking and unblocking levels for the 5th harmonic restraint to manage excessive overvoltage situations.

(viii) The relay shall have saturation discriminator as an additional safeguard for stability under through fault conditions.

(ix) All output relays of the differential relay shall be suitable for both signals and trip duties.

(x) The relay shall be with 2-bias winding. The relay shall have transient bias to enhance the stability of differential element during external fault condition.

(xi) The relay shall have adjustable bias slopes; slope m1 from 5 % to 50 % and slope m2 from 15% to 150 % and m3 from 100% to 150 % so as to provide maximum sensitivity for internal faults with high stability for through faults. The relay shall have adjustable operating setting range of 10% to 50% at zero bias.

(xii) The relay shall have an unrestrained high set element to back up the biased differential function and the setting range for it shall have a minimum setting of 5pu and a maximum setting of 30 pu. The relay shall be such that there will not be any necessity of changing the setting of the relay whenever the transformer taps are changed from +5%to-10%.

(xiii) Differential relay shall have facility for setting, parameterization, downloading of stored data, data captured by disturbance recorder etc. locally through PC. Licensed version of the relay software should be provided as per the lifespan of the relay. Necessary software, cables, connectors and other accessories as required for download, analyze data etc. shall be within the scope of successful bidder.

(xiv) The relay shall have disturbance recording (with time stamp) function with suitable no. of analog and digital channels, Memory size and number of disturbances stored in the relay shall be clearly indicated in the offer. No. of site selectable binary inputs, binary outputs, watchdog contact details, front and rear communication port details along with necessary hardware and software details shall be furnished.

11.2 The following are the technical requirement of Differential protection relay:

Sl. No.	Feature and Function	Technical requirement
1	Purpose and application	It is intended to automate the Switchgears specified in the scope of supply and use Communicable Numeric relays for Protection, Control, Metering and Status monitoring. This specification is based on the understanding that an integrated Automation System along with protections shall be provided and same shall have provisions for Integration with SCADA system. All the feeders shall be remote controlled from APDCL's SCADA and from the local console of the numerical relays. Numerical multifunctional combined Microprocessor based Transformer protection and management relay to protect the 33kV Transformer from all electrical and other faults along with reporting system, Disturbance record for fault analysis. It shall be numerical adjustable/variable percentage biased type differential relay. Manufacturer should comply with any especial requirement or feature asked for retrofitting the relays. Relay should be IEC 61850 compliant.
2	Main Protection feature	• The relay shall be very fast in operation with an operating time less than 40 millisecond at 5 times setting. • The relays shall be inherently stable for external through fault conditions without affecting the speed of operation for internal faults. • The relay shall have built in facility of ratio and phase angle correction. • The relay shall be provided with 2nd harmonic restraint or any other inrush proof feature to prevent operation due to magnetizing in rush current when the transformer is charged either from HV or LV side. But this shall not affect the speed of operation for internal fault. • It shall be provided with 5th harmonic restraint features to prevent operation due to possible over excitation of the transformer. This shall also not affect the speed of operation for internal fault. • The relay shall have 2 instantaneous phases over current(50) elements and 2 IDMT(51) phase over current elements with standard
		IEC / ANSI characteristics selection. It shall be possible to select either winding 1 or winding 2 for each element. Shall have possibility to add user defined characteristics for IDMT element. • The relay shall have facility to provide derived earth fault

		current protection as well as measured earth fault protection. Relay shall have 2 elements each for Instantaneous and IDMT derived earth fault (50N/51N), 2 elements each for Instantaneous and IDMT measured earth fault (50G/51G). It shall be possible to select either winding 1 or winding 2 for each element. Shall have possibility to add user defined characteristics for IDMT element. • The relay shall be with 2-bias winding. The differential characteristics shall incorporate two bias stages - first stage for steady state errors i.e tap position and CT ratios and second stage for transient errors i.e. CT saturation. • The relay shall have Negative Phase Sequence O/C protection with 2 DTL & 2 IDMT elements for measurement of derived Negative sequence current. Shall be possible to select STD IEC/ANSI characteristics. It shall be possible to select either winding 1 or winding 2 for each element. • The relay shall be such that there will not be any necessity of changing the setting of the relay whenever the transformer taps are changed from +5% to-10%. • The relay shall have high Impedance Restricted Earth fault Protection for LV side . • The relay shall have Circuit Breaker failure function. 2 element shall be provided- 1 element per winding. The circuit breaker fail function shall be triggered from an internal trip signal or from a binary input. Alternatively, if the trip is from a mechanical protection the circuit breaker position can be used to determine a failure. A second time delay shall be available to enable another stage to be utilized if required. An input shall also available to bypass the time delays when the circuit breaker is known to be faulty. • The relay shall have Negative Phase Sequence O/C protection with 2 DTL & 2 IDMT elements for measurement of derived Negative sequence current. Shall be possible to select STD IEC/ANSI characteristics. It shall be possible to select either winding 1 or winding 2 for each element.
3	Processor feature	Relay shall be completely Numerical with protective elements having software algorithm based on sampling of Analog inputs. Sampling Rate of Analog Signal: The sampling rate should be 1000 samplesfor 50 Hz signal or better for each analog channel. Hardware based measurements shall not be acceptable.
4	Operational Philosophy	The operation of Relay shall be possible both locally from the Switchgear and remote & Local Work station. The local position shall be displayed in remote / local workstation and remote operation shall be blocked if the switch is in Local. Clear control priorities shall prevent initiation of operation of a single switch at the same time from more than one of the various control levels and there shall be interlocks among

		various control levels. The priority shall always be with the lowest enabled control level. Relay accuracy shall not be affected by system frequency fluctuation.

5	Status/Optical Inputs/Binary inputs	1. Minimum 14 number binary inputs are required. 2. All binary inputs should be settable threshold voltage from 20 to 170 V DC. 3. Setting group is required to be changed with any binary input status. 4. Trip circuit supervision with BI status 5. The Binary inputs shall be acquired by exception with 1ms resolution. Contact bouncing in binary inputs shall not be assumed as change of state. 6. Relay should have comprehensive self diagnostic feature with remote indication of relay failure and alarm shall be generated without tripping of circuit. 7. Provision of Testing relays output without any current injection. 8. No. of programmable LEDs - at least 10 nos. with latching option. 9. All the BI should be freely configurable.
6	Main measuring and reporting feature	All measurements should be in primary quantities. Minimum following displays are required in alpha numeric:- 1. Three phase (Positive sequence) current 2. Neutral (zero sequence) current 3. Differential current, Voltage, Frequency etc. 3. All the trips should have clear indication on the relay terminals 4. Resetting should be selectable as hand reset or auto reset. 5. The default relay LCD shall be user defined to display primary circuit loading.
7	Tools for Fault diagnostics	1. Fault record: The relay shall have the facility to store at least last 100 time-stamped fault records with information on cause of trip, trip values of electrical parameters. 2. Event record: The relay shall have the facility to store at least 1000 time stamped event records with 1ms resolution. 3. Disturbance records: The relay shall have capacity to store at least 15 sec disturbance record waveforms.
8	Memory and Recording Feature	1. The relay setting and programming should be stored in EEPROM so that during Aux. Power failure no data is lost. The last 5 fault DR records should be in flash memory and DR will not erase in case of DC supply fail for more than 2 days.2. Relay should have event log, trip log and DR record. All logs should go in to history.3. All tripping of relay should initiate DR in auto without extra binary input. Triggering of DR with binary input should be user configurable.4. Should be able to record at least 10 fault records and 20 event records in flash memory.5. Minimum 10 nos. of latest trip log with

		cause of trip should be stored in memory along with date and time stamping. The memory should not be lost with the switching off of DC.6. The relay should have fault-recording feature with current waveform and Digital Input status. The fault waveform should consist of minimum four current waveforms of three phase current and zero sequence current and DI status. Triggering time for Pre and Post should have user selectable. This record should be in flash memory for minimum 7(seven) days even after switching off the DC supply.
9	Auxiliary Supply	Both 240 V AC and 110 V [- 25% to + 10%] 2 wire unearthed system. Necessary software shall be in-built for proper shutdown and restart in case of power failure.
10	Rated CT/PT secondary	5/1 Amp(User selectable) , CTs used to be protection class
11	Rated frequency	50 HZ ±5%
12	Ambient condition	1. Operating ambient temperature upto 60Deg C. 2. Operating Humidity upto 95%. 3. Relay shall meet the requirement for withstanding electromagnetic interference according to relevant parts of latest IEC 60255-26. Failure of single component within the equipment shall neither cause unwanted operation nor lead to a complete system breakdown.
13	Module and Mounting	1. Relay should be flush mounted type. 2. Module to be preferably draw out type then it should have CT shorting facility of make before break type. 3. Mounting in switchgears located in non AC rooms. 4. Galvanic isolation between field connection and relay hardware should be there. 5. The relays should be housed in a robust metal case suitable for panel mounting conforming to IP 54 (Front face) and IP 20 in the rear side.
14	Watchdog and self monitoring	The relay should have facility to comprehensively monitor the healthiness of its circuits and components by own monitoring system. In case of any problem of hardware and software elements of the relay, the fault diagnosis information shall be displayed on the LCD and an alarm should be generated by one of the output contacts. The alarm as soft signal to be sent to SCADA system as well. Necessary support documentation explaining the self-diagnostic feature shall be furnished. Watch dog contact shall be provided in addition to required 14 BI, 10 BO (Relay supervision contact must be additional from 10 BO). All the BI & BOs shall be freely configurable. All binary inputs should be settable threshold voltage from 20…170 VDC.

15	Settings	As detailed in Clause No. 11 of Technical Specification
16	Relay outputs	Minimum 10 number binary/digital output are required out of which 1. One potential free change over contact should be provided for start inhibit of relay. 2. All o/p contact should be freely programmable. 3. To enable fast direct tripping of the circuit breaker, the relay must have 2 optional high-speed binary outputs with an operate time of ≤ 2-3 ms. The binary output contacts shall be rated to make and carry 30 A for 0.5 s with a breaking capacity of ≥1 A (L/R<40 ms). 4. Rating of trip contacts. a) Contact durability>10K operation. b) 30 Amp make and carry for 0.5 sec for trip contact. c) Make and carry for trip contacts L/R<=50ms Rating of Alarm contacts. d) 5 Amp make and carry continuously (ac or dc).
17	Relay software and Man Machine Interface	1. The offered relay shall have a comprehensive local MMI (man- machine interface) for interface. It shall have the following minimum elements so that the features of the relay can be accessed and setting changes can be done locally. - At least 48 character alphanumeric backlit LCD display unit. - The LCD panel should be able to display graphical data such as at least 2 Configurable SLDs, vector diagram of instantaneous power. 2. Should have password protected key padlock. The password of the relay should of Level 4 to provide security to the setting parameters. 3. Tactile keypad for 4 navigation keys for browsing and setting the relay menu. 4. Necessary software for relay setting , retrieving DR, event log, trip log should be supplied by the Manufacturer. The License of the software is to be issued to APDCL for the entire lifespan of the relay. 5. Additional functions can be added to RELAY by software up- gradation and downloading this upgraded software to the relays by simple communication through PC. 6. Multiuser/Corporate license for installation on minimum 35 nos. of PCs/Laptops.
18	Date and time	Date and Time stamping with faults and record. The clock should be powered from internal cell and should not require setting after every DC switching. The internal cell life shall be minimum 5 years. Time synchronization by SNTP. The relay must support IEEE 1588 v2 for high accuracy time synchronization in Ethernet based applications.

19	Lugs and terminators	All CT and PT terminals shall be provided as fixed (screwed) type terminals on the relay to avoid any hazard due to loose connection leading to CT opening or any other loose connection. Necessary amount of lugs should be supplied along with each relay for CT connection and control wiring.
20	Manuals, Drawings and Literature	1. The relays should be supplied with manuals with all technical and operating instructions. 2. All the internal drawings indicating the logics and block diagram details explaining principle of operation should be given at the time of supply. 3. Mapping details shall be submitted in IEC format.
21	Standard documentation per Relay, according to IEC 61850	1. MICS document (model implementation conformance statement). 2. PICS (protocol implementation conformance statement. 3. Conformance Test certificate from DNVGL/CPRI. 4. PIXIT document. All the above mentioned certificates shall be submitted. 5. ICD file 6. SCD file
22	Extendibility in Future	The Manufacturer shall provide all necessary software tools along with source codes to perform addition of bays in future and complete integration with SCADA by the User. These software tools shall be able to configure relay, add analog variable, alarm list, event list, modify interlocking logics etc. for additional bays/equipments which shall be added in future.
23	Lifespan	The supplier should mention following:- 1. Product maturity: The Manufacturer should mention the time period for which the product is in the market. 2. Expected product life shall be minimum 20 years. 3. Hardware/Firmware change notification process and Upgrades to be provided free of cost within the Guarantee period/5 years whichever is later, if needed. 4. Lifespan of standard tools and processes for relay configuration, querying and integration.
24	Standards	As detailed in Table 1: List of Standards Applicable Clause No. 3.2 of Technical Specifications.
25	Communication Port	1. The relay should have Latest IEC 61850 Edition 2 or better Communication Protocol. 2. Relay should support PRP(parallel Redundancy protocol) as per IEC 62439-3. 3. Functioning of Relay shall not hamper to fault occurring any interconnected relay. 4. The Relays must have two fiber-optic Ethernet ports with HSR and PRP-1. 5. The relay shall have a USB/RS232/RJ45 communication

		port for connecting to a local PC/Laptop for setting and viewing the data from the relay. Both IEC 103 (to communicate with existing SAS) and IEC 61850 must be available simultaneously in single relay with minimum two nos. redundant communication port (FO or RJ45). Use of any type of converter is not acceptable.
26	Name Plate and marking	Each RELAY shall be clearly marked with manufacturer's Name, type, serial no. and electrical rating data. Name plates shall be made of anodized aluminium with white engraving on black surface.
27	Guarantee	Relays will be guaranteed for the period of sixty six months from the date of last receipt at respective T&C Division.
28	Performance	Any problem in the said period should be attended free of charge inclusive of repair/replacement of relays/ component (both H/W, S/W).
29	Type Test	As detailed in the table for type tests in Clause No. 5 of technical specifications.
30	Training	Suitable training to be imparted to employer persons on the following items:- 1. Relay setting and parameterization 2. Relay configuration with respect to I/P, O/P and functional block for protection. 3. GOOSE configuration. 4. Configuration and Interfacing required for third party SCADA System Integration. 5. Diagnostic features The details of syllabus to be finalized with APDCL.
31	Inter-operability test	As detailed in Interoperability Test and Demonstrations in Clause No. 7 of technical specifications.

11.3 **PROTECTION SCHEMES FOR NUMERICAL Transformer differential protection relay**:

(a) Biased differential protection (87 T): Numerical biased differential protection relay with inbuilt current amplitude & vector group compensation feature & also with differential high set element for two winding power transformers compliant to IEC 60255.

C.T. secondary	Selectable 1 Amp / 5 Amps for both HV & LV sides
Online display of HV & LV phase currents & differential current- Needed	
Adjustable bias setting	5 to 50% In.
Operation based on fundamental frequency -50 Hz	
Programmable HV/LV CT ratio of T/F vector group -Needed	

Inbuilt REF protection	Needed
Inbuilt HV & LV side over current & earth fault protection - Needed	
Inbuilt transformer trouble auxiliary relay - Needed	
Backlit LCD display - Needed	
Harmonic restrain feature- Needed with settable feature for 2nd and 5th Harmonics	
Storing facility of latest 100 fault events with real time clock	
Password protection – 4 Level	
DC burden	Quiescent condition – approx. 4 watt Under trip condition – 110 Volt - approx 4 watt, 110 Volt - approx 7 watt.
AC burden	Through current only: approx0.15VAfor1amp&0.30VAfor5amp(per bias circuit) Bias & differential Ckt only: 2.8 VA for 1 amp & 3.2 VA for 5 amp.
Contact arrangements	Two change over self reset tripping contacts & two annunciation contacts
Contact rating	Make & carry 7500VA for 0.2 sec. with max 30 A & 300 V AC or DC carry continuously 5 amp AC or DC break 1250 VA AC or 50 W DC resistive, 25 W L/R – 0.04 s subject to max. 5 amp & 300 Volts
Current Input	Six for differential & one for REF

(b) Numerically stabilized low-impedance restricted earth-fault protection (64R)

This function should be provided to maximize the sensitivity of the protection of earth faults. The REF function should be selected separately for each winding and programmable as either high or low impedance. The REF function should be able to share the same CTs with the biased differential function. As in traditional REF protections, the function should respond only to the fundamental frequency component of the currents. The REF protection provided should be suitable for auto transformer also.

The numeric REF protection relay shall provide the following functions:

1. The relay shall both Numerically stabilized low-impedance restricted earth- fault protection (64R) and High-impedance restricted earth-fault protection with metrosil is required.
2. Current / voltage operated high impedance type with a suitable setting to cover the maximum portion of transformer winding. Necessary calculation to prove the above winding coverage shall be furnished along with the tender.
3. Tuned to the system frequency. Have suitable nonlinear resistor as required to limit the peak voltage and stabilizing resistance.

4. Operating time shall be less than 40ms.
5. Have suitable stabilizing resistor to prevent mal operation during external faults, if necessary.
6. Bidder to consider required Non Linear (VDR) resistance of metrosil make and stabilizing resistance required for the Restricted Earth Fault protection.

(c) Overload Protection:

The RELAY shall have thermal overload protection for alarm and trip condition with continuously adjustable setting range of 10-400% of rated current.

(d) Over current Protection (50,51):

The RELAY shall have three stages of definite time over current protection as back up operating with separate measuring systems for the evaluation of the three phase currents, the negative sequence current and the residual current. In addition the relay shall have three stages of Inverse time overcurrent protection operating on the basis of one measuring system each for the three phase currents, the negative sequence current and the residual current.

(e) Negative-sequence over current protection: One stage of negative sequence over current protection with DT & IDMT feature (user selectable) to be provided.

(f) Local Breaker Back-Up Protection:

The relays shall have in-built LBB protection to detect the failure in the local breaker using the undercurrent Criteria and zero crossing detection and trip the upstream breaker.A set of D.C. voltage operated auxiliary relays with coil cut-off arrangement and 2-N/O and 2-N/C contacts, Self reset with Hand reset flag indicator type shall be provided for each Transformer for:

(a) Buchholz Alarm.

(b) Buchholz Trip.

(c) Winding Temp.

(d) Trip & winding Temp alarm.

(e) Oil Temp trip & Oil Temp Alarm.

(f) Pressure Release Device Trip.

11.4 MEASUREMENTS:

All measurements should be in primary quantities. The default relay LCD shall be user defined to display primary circuit loading. As a minimum, the relay should measure and display in alpha-numeric the Instantaneous, Minimum and Maximum values with time stamp following standard quantities:

(a) Phase currents and Phase Angles (HV & LV)
(b) Neutral currents - derived and measured
(c) Bias/Restraining Current
(d) Differential Currents
(e) Thermal state
(f) Positive, negative and Zero sequence current
(g) Ratio of negative to positive sequence current
(h) Breaker operation counter
(i) Breaker trip counter for Earth Fault
(j) Breaker trip counter for Over Current.
(k) Breaker operating time
(l) Resetting of display should be selectable as hand reset or auto reset.

11.5 Setting range of offered relays shall comply the below Table, bidder to confirm each range in below table, and this document to be submitted with GTP.

Sl No	Protection Function: (Numerical Transformer protection (Two Winding) relay)	Bidder to Confirm (Yes/No)
1	Three Phase Non Directional Over Current Protection	
	Plug Setting	
	Low Set Stage - 0.05 5.00 × In, in steps 0.01	
	High Set Stage - 0.10 40.00 × In in steps 0.01	
	Inst Stage - 1.00 40.00 × In in steps 0.01	
	Time Setting	
	Time multiplier Low Stage and High Set stage 0.05 15.00 in step 0.01	
	Operate delay time For Low stage and high stage 40...200000 ms in step 10	
	Operate delay time For Inst Stage 20...200000 ms in step 10	
	Operation accuracy: ±1.5% of the set value or ±0.002 × In	
2	Three Phase Non Directional Earth Fault Protection	
	Plug Setting	
	Start value Low Stage - 0.010 5.000 × In, in step 0.005	
	High stage - 0.10 40.00 × In, in step 0.01	
	Inst Stage - 1.00 40.00 × In, in step 0.01	
	Time Setting	

	Time multiplier Low and High stage - 0.05 15.00 in step 0.01	
	Operate delay time Low & High stage - 40...200000 ms in step 10	
	Inst Stage - 20...200000 ms in step 10	
	Operation accuracy: ±1.5% of the set value or ±0.002 × In	
	High operate value: 500...3000 %Ir in step 10	
	Low operate value: 5...50 %Ir in step 1	
	Slope section 1 : 10...50% in step 1	
	Slope Section 2: 100...500 %Ir in step 1	
	Restraint mode (Selectable) : Waveform	
	2nd Harmonic + waveform	
	5th Harmonic + waveform	
	2nd Harmonic + 5th Harmonic + Waveform	
	Start value for 2nd Harmonic: 7...20% in step 1	
	Start value for 5th Harmonic : 10...50% 1	
	Operation Accuracy: ±2 Hz ±3.0% of the set value or ±0.002 × In	
3	Numerically stabilized low-impedance restricted earth-fault protection	
	Operate value: 5...50 %In in step 1	
	Minimum operate time: 40...300000 ms in step 1	
	Restraint mode: 2nd Harmonic	
	Start value: 2nd harmonic: 10...50% in step 1	
	Operation accuracy: ±2.5% of the set value or ±0.002 x In	
4	High-impedance biased restricted earth-fault protection:	
	Operate value: 1.0 50.0%In in step 0.1	
	Minimum operate time: 40...300000 ms in step 1	
	Operation accuracy: ±1.5% of the set value or ±0.002 × In	
5	Negative-sequence over current protection:	
	Start value 0.01 5.00 × In, in step 0.01	
	Time multiplier: 0.05 15.00 in step 0.01	
	Operate delay time: 40...200000 ms in step 10	

12.0 **DRAWING & LITERATURE:**

Soft copy of the following drawings and literature shall be submitted along with the order copy :

(a) Principal dimension details of each RELAYs.

(b) Schematic Wing Diagram for Terminal Block is to be submitted. Moreover it should be pasted on the casing of the RELAYs for ease of commissioning works.

(c) Illustrative, descriptive literature, General Technical Data & Specification of Devices.

(d) Logic Diagram

13.0 **DOCUMENTS TO BE SUBMITTED ALONG WITH THE OFFER:**

a. The contractor shall invariably submit the following documents, failing which the offers are liable for rejection:
b. Undertakings from relay manufacturer regarding:

i. Non-phasing out of the relays for at least 10 years from the date of supply.
ii. For extending technical support and back-up guarantee.
iii. Detailed catalogue/ technical literature in respect of all components/ accessories including bought-out items.

c. Names of supplier of bought out item.
d. List of testing equipment available with the manufacturer.

GTP-13: NON DIRECTIONAL NUMERICAL OC & EF RELAY

SN	Parameter	Requirement as per TS	Bidder's offer
1	Non Directional OC & EF Relay		
a	Make		
b	Type		
c	Model no (Complete Article no)		
d	Auxiliary supply	110 V DC and 230 VAC	
e	Mounting	Flush Mounted Draw out type	
2	Conformance to		
a	IEC 60255	Yes	
b	IEC 61850 Ed I & II	Yes	
C	Electromagnetic Interference as per IEC 60255-26	Needed	
d	IEC 61850 9-2 LE for process bus	Needed	
e	PRP as per IEC 62439-3	Needed	
f	HSR	Needed	
3	CT and VT inputs		
	No of CT Inputs		
	For Over Current	3	
	For Earth Fault	1	
	VT inputs	Required	
4	Size of the LCD Display	Large mimic graphical display	
	Password protection	4 level password protection Needed	
5	Relay equipped with CB open and close push buttons	Yes	
6	The relay should have Protection schemes		
6.1	Three phase Over Current (Non-Directional)	Yes	
6.2	Earth Fault (Non-Directional)	Yes	
6.3	Thermal Overload	Yes	
6.4	Broken Conductor with 1 stage	Yes	
6.5	Inrush Blocking Feature	Yes	
6.7	High Impedance with Earth fault Protection	Yes	
6.8	Negative Phase Sequence Over Current feature	Yes	

6.9	Circuit breaker failure Protection	Yes	
6.10	Trip Circuit Supervision for Two Trip Coil	Yes	
6.11	Cold Load Pick up	Yes	
6.12	Fuse Fail Super Vision	Yes	
6.13	Bus zone protection (11 kV Switchboard only)	Yes	
6.14	Life Span [guaranteed]	10 Years	
7			
A	One time delayed element and two high set elements	Yes	
B	Setting range and Step for IDMT element for over Current	O/C Start Value : 0.05 to 5xIn in steps of 0.01	
C	Time multiplier settings	0.05 15.00 in steps of 0.01	
D	Selectable time curve for IDMT Element	Yes	
E	Setting range and Step for high set elements for both Current	0.10 to 40 x In in steps of 0.01 [High Set Stage] 1 to 40 x In [Inst. Stage]	
F	Time delay	40…..200000 ms in steps of 10	
G	Setting range and Step for IDMT element for Earth Fault Current	E/F Start Value : 0.05 to 5 x In in steps of 0.01	
H	Time multiplier settings	0.05 15.00 in steps of 0.01	
I	High Set with Delay for Earth Fault Current	E/F High Set : 0.10 to 40 x In in steps of 0.005	
	Time delay	0.05….15 in steps of 0.01	
J	sampling rate of analog signal	Relay must have user selectable sampling rate up to 1000 Samples /cycle @ 50 Hz	
8	Whether remote controllable from SAS	Yes	
9			
A	No of Binary Inputs	14 nos.	
B	Max. No of Binary inputs (internally Feasible)	To be specified by the bidder	
C	Voltage ratings of Binary Inputs	Settable threshold voltage from 40 to 150%of DC SUPPLY.	
D	Provision for testing without current	Yes	

	injection		
10	Supervision for CB Open and Close Status	Yes	
11	No. of Programmable LEDs and No. of non Latched LEDs	9 nos. of freely configurable LEDs 3 nos. of fixed LEDs.	
12	Analog measurement and display supported	Yes	
13	Fault Record Storage capacity	100 latest with time stamping	
14	Event Storage capacity	1000 with time stamping	
15	Disturbance record storage capacity	20 sec DR Waveform	
16	MMI with Keypad and LCD Provided	Yes	
17	CT Secondary should be user selectable	1A/5A	
18	Rated Frequency	50 Hz	
19			
A	Operating ambient temperature	0 to 55o C	
B	Relative Humidity	93 % Non Condensing	
20	watch Dog	Yes	
21	CT ratio Settings	SETTABLE	
22			
A	No of Binary Output contact	10 Nos + 1 No. watch Dog	
B	Max. No of Binary outputs (internally Feasible)	To be specified by the bidder	
C	High Speed Output contact with less than 3 ms operation time	2 nos. (Included in total 10 nos.)	
D	Contact Rating	8 Amp Continuous	
	Make and carry for 3 Sec	15 Amp	
	Make and carry for 0.5 Sec	30 Amp	
	Operation time	less than 2-3ms	
23	Mode of Time Synchronization	SNTP via IEC 61850	
24	Type of Lugs and terminations		
A	For BI/BO	Pin type	
B	For CTs	Ring Type	
25	MTTR	30 Mins	
26	PCB used in the relay is in compliance of HEC as per IEC 60068	Required	
27	Compliance to Type Test	Type test reports attached in the TS.	
28	Communication Port		
a	Rear Port Details -100 MBPS	2 Nos. RJ 45 Port / 2 no. FO port	

b	Front Port Details -10 MBPS	1 No. RJ 45 Port / 1 no. USB Port	
29	Whether time synchronization are native to the RELAY	Yes	
30	Start and Trip Contacts are freely Programmable	Yes	
31	RELAY should be directly connected to the laptop with out the use of any intermediate converter through RJ 45 Port		
32	Specify the application for configuration and data downloading from the RELAY		
33	Software is to be provided for data downloading of events, Fault records for evaluation of the same		
34	Graphical configuration tool for I/O,O/P and functional building block for protection and control		
35	Any other software required for integration with SCADA		
36	DC Burden	Less than 20 W	

Signature of the Bidder

Date and Stamp

GTP-13.1: NUMERICAL DIFFERENTIAL RELAY FOR TRANSFORMER

SN	Parameter	Requirement as per TS	Bidder's offer
1	Differential Relay		
a	Make		
b	Type		
c	Model no		
d	Auxiliary supply	Both 110 V DC and 230 VAC	
e	Mounting	Flush Mounted Draw out type	
2	Conformance to		
a	IEC 60255	Yes	
b	IEC 61850 Ed I & II	Yes	
C	IEC 61850 9-2 LE for process bus sample values	Needed	
D	Electromagnetic Interference as per IEC 60255-26	Needed	
e	PRP as per IEC 62439-3	Needed	
f	HSR	Needed	
3	No of CT Inputs		
	For Differential protection	6	
	For Restricted Earth Fault	1	
4	Size of the LCD Display	Large mimic display	
	Password protection	4 level password protection Needed	
5	Relay equipped with CB open and close push buttons	Yes	
6	The relay should have Protection schemes		
a	Three phase Over Current	Yes	
b	Earth Fault	Yes	
c	Sensitive earth Fault	Yes	
d	Differential Protection	Yes	
e	Adjustable Bias Settings	Yes	
f	REF with High Impedance	Yes	
g	Inrush Blocking Feature	Yes	
i	Over and Under Frequency	Yes	
j	Negative Phase Sequence Over Current feature	Yes	
k	Circuit breaker failure Protection	Yes	
l	Trip Circuit Supervision	Yes	
m	Over fluxing	Yes	
n	Harmonic restraints settable for 2H and 5H	Required	

o	Life Span [guaranteed]	10 Years	
7			
a	One time delayed element and two high set elements	Yes	
b	Setting range and Step for IDMT element for both Current	O/C Start Value : 0.05 to 5xIn in steps of 0.01	
c	Time multiplier settings	0.05 15.00 in steps of 0.01	
d	Selectable time curve for IDMT Element	Yes	
e	Setting range and Step for high set elements for both Current	O/C Start Value : 0.10 to 40 x In in steps of 0.01 [High Set Stage] 1 - 40 x In [Inst. stage]	
f	Time delay	40….200000 ms in steps of 10	
g	Setting range and Step for IDMT element for Earth Fault Current	E/F Start Value : 0.010 to 5 x In in steps of 0.005	
h	Time multiplier settings	0.05 15.00 in steps of 0.01	
i	High Set with Delay for Earth Fault Current	E/F High Set : 0.10 to 40 x In in steps of 0.005	
	Time delay	0.05….15	
j	sampling rate of analog signal	Relay must have user selectable sampling rate up to 1000 samples /cycle @ 50 Hz	
8	Whether remote controllable from SCADA	Yes	
9			
A	No of Binary Inputs (Equipped)	14	
B	Max. No of Binary Inputs (internally Feasible)	To be specified by the bidder	
C	Voltage ratings of Binary Inputs	Settable threshold voltage from 40 -150% of DC supply.	
D	Provision for testing without current injection	Yes	
10	Supervision for CB Open and Close Status	Yes	
11	No. of Programmable LEDs and No. of non Latched LEDs	9 nos. of freely configurable LEDs 3 nos. of fixed LEDs.	
12	Analog measurement and display supported	Yes	
13	Fault Record Storage capacity	100 latest with time stamping	
14	Event Storage capacity	1000 with time stamping	
15	Disturbance record storage capacity	20 sec DR Waveform	
16	MMI with Keypad and LCD Provided	Yes	
17	CT Secondary should be user selectable	1A/5A	
18	Rated Frequency	50 Hz	

19			
a	Operating ambient temperature	0 to 55o C	
b	Relative Humidity	93 % Non Condensing	
20	watch Dog	Yes	
21	CT ratio Settings	SETTABLE	
22			
A	No of Binary Output	10 Nos + 1 No. watch Dog	
B	Max. No of Binary outputs (internally Feasible)	To be Specified by bidder	
C	Contact Rating	8 Amp Continuous	
	Make and carry for 3 Sec	15 Amp	
	Make and carry for 0.5 Sec	30 Amp	
	Operate time	less than 1 ms	
23	Mode of Time Synchronization	SNTP and PTP	
24	Type of Lugs and terminations		
a	For BI/BO	Pin type	
b	For CTs	Ring Type	
25	MTTR	30 Mins	
26	PCB used in the relay is in compliance of HEC as per IEC 60068	Required	
27	Life Span [guaranteed]	10 years	
28	Compliance to Type Test	Type test reports attached	
29	Communication Port		
A	Rear Port Details	2 No. RJ 45 Port/ 2 Nos. FO Port	
B	Front Port Details	1 No. RJ 45 Port/ 1 No. USB	
30	Whether time synchronization are native to the relay	Yes	
31	Start and Trip Contacts are freely Programmable	Yes	
32	Relay should be directly connected to the relay without the use of any intermediate converter through RJ 45 Port		
33	Specify the application for configuration and data downloading from the relay		
34	Software is to be provided for data downloading of events, Fault records for evaluation of the same		
35	Graphical configuration tool for I/O, O/P and functional building block for protection and control		
36	Any other software required for integration with SCADA		

37	DC Burden	Less than 20 W	

Signature of the Bidder

Date and Stamp

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TECHNICAL SPECIFICATION NO – A15 (TRI-VECTOR METER)

1.0 SCOPE:

1.1. This specification covers the design, engineering, manufacture, assembly, inspection and testing before supply and delivery at site/ FOR destination of class 0.2s accuracy static HT tri-vector CT/ PT operated meters, along with other associated equipment as per details given in this specification. The meters shall be used for commercial/ tariff metering for inter utility power flows/ bulk consumers as well for Availability Based Tariff application.

1.2. The meter shall be complied with Indian Companion Standard (ICS) of Category B for DLMS specification. The Category B specifies the parameters to be used for metering along with other additional features. The meter records parameters under import and or export conditions.

1.3. The meter shall be supplied in 3-phase 4-wire mode. However, provision shall be there to configure the meter in 3-phase 3-wire mode, as & when required, through authenticated/secured commands.

1.4. The metering system shall be projection type as per the field requirements. Meter must have a base and cover and shall incorporate "cover open" tamper with date and time stamp, if and when meter cover is opened from base.

1.5. The meter shall have wide secondary current range support i.e. same meter shall be put up for 1A or 5A rating as per field availability of CT's. The meter shall support 200% Ibasic.

1.6. It is not the intent to specify completely herein all the details of the design and construction of material. The material shall, however, conform in all respects to the best industry standards of engineering, design and workmanship and shall be capable of performing for continuous commercial operation in a manner acceptable to the purchaser The offered equipment shall be complete in all respects including all components/ accessories for effective and trouble free operation according to the specifications. Such components shall be deemed to be within the scope of this specification irrespective of whether those are specifically brought out or not.

2.0 APPLICABLE STANDARDS:

2.1 STANDARDS

The equipment shall conform (for testing, performance and accuracy) in all respects the relevant Indian/ International metering standards with latest amendments thereof unless otherwise specified.

S. No.	Standard No.	Title
1	IS 14697	AC static transformer operated Watt-hour and VAR- hour meters for class 0.2s and 0.5s
2	CBIP technical report no. 304 & 325	Specification for AC static electricity energy meters and testing
3	IS 15959 DLMS companion Standard (ICS)	AC static transformer operated Watthour and VAR hour meters for class 0.2s category B compliant)

		metering

2.2 STANDARDS FOR METER READING INSTRUMENT

The Meter Reading Instrument (CMRI) shall conform in all respects to the following standards:

S. No.	Standard No.	Title
1	CBIP technical report no 111 with latest amendment	Specification for Common Meter Reading Instrument

2.3 Equipment matching with requirements of other national or international standard which ensure equal or better performance than the standards mentioned above shall also be considered. When the equipment offered by the bidder conforms to standards other than those specified above, salient points of difference between standards adopted and standards specified in this specification shall be clearly brought out in the relevant schedule and copy of such standards along with their English translation shall invariably be furnished along with the offer.

3.0 PRINCIPAL PARAMETERS:

The energy metering rack with meters shall be indoor type connected with the secondary side of indoor current and voltage transformers and mounted in suitable panel/ cubicles.

S. No.	Item	Specification
1.	Type of Installation	Indoor panel/ cubicle mounted
2.	PT secondary	3x110V/√3 Phase to Neutral (3P4W) Variation -30% to +20%
3.	CT secondary	3 x /-1 Amps or 3 x /-5 Amps (configurable as per requirement)
4.	Dual Auxiliary AC/ DC Supply	110/ 220V (Variation as per the relevant IS)
5.	System frequency	50HZ +/- 5%
6.	Earthing System	Solidly Grounded

The meter should be suitable for working with above supply variations without damage and without degradation of its metrological characteristics.

4.0 TECHNICAL REQUIREMENTS:

4.1 DISPLAY

The meter shall have Graphical LCD with backlight for proper depicting of values in user friendly manner like values with unit, OBIS codes, favorite page etc.

4.2 POWER FACTOR RANGE

The metering system shall be suitable for full power factor range from zero (lagging) through unity to zero (leading). The metering module shall work as an active energy import and export meter along with reactive (lag and lead) meter. The energy measurement should be true four quadrant type.

4.3 ACCURACY

Class of accuracy of the metering system shall be 0.2s for energy measurement. The accuracy should not drift with time.

4.4 POWER CONSUMPTION OF METER

(i) The meter must be self powered type and must be capable to operate with the power drawn from the Station PT power supply.
(ii) Voltage Circuit: The active and apparent power consumption in each voltage circuit including the power supply of metering module at reference voltage, reference temperature and reference frequency shall not exceed 1.5 Watt per phase and 10 VA per phase respectively.

(iii) Current Circuit: The apparent power taken by each current circuit at basic current, reference frequency and reference temperature shall not exceed 1 VA per phase.

4.5 STARTING CURRENT

The metering module should start registering the energy at 0.1% Ib and unity power factor.

4.6 MAXIMUM CURRENT

The rated maximum current of the metering module shall be 120% of basic current (Ib).

4.7 The meter shall work accurately irrespective of phase sequence of the mains supply.

4.8 GENERAL CONSTRUCTIONAL REQUIREMENTS.

Meters shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However the following should be ensured:

i) Personnel safety against electric shock
ii) Personnel safety against effects of excessive temperature
iii) Protection against spread of fire
iv) Protection against penetration of solid objects, dust and water in normal working condition

All the materials and electronic power components used in the manufacture of the meters shall be of highest quality and reputed make to ensure higher reliability,

longer life and sustained accuracy.

The meters shall be designed with application specific integrated circuits. The electronic components shall be mounted on the printed circuit board using latest Surface Mount Technology (SMT).
All insulating materials used in the construction of meters shall be non - hygroscopic, non-aging and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating.

The metering system when mounted in panel shall conform to the degree of protection IP53 in the normal working condition of IS 12063/ IEC 529 for protection against ingress of dust and moisture.

4.9 MANUFACTURING ACTIVITIES

Meter should be manufactured using SMT (Surface Mount Technology) components and by deploying automatic SMT pick and place machine and reflow solder process; the Bidder should own such facilities.

Quality should be ensured at the following stages:

i) At PCB manufacturing stage, each board shall be subjected to computerized bare board testing.
ii) At insertion stage all components should undergo computerized testing for conforming to design parameters and orientation.
iii) Complete assembled and soldered PCB should undergo functional testing using Automatic Test Equipment.
iv) Prior to final testing and calibration, all meters shall be subjected to accelerated ageing test to eliminate infant mortality.
v) The calibration of meters shall be done in-house.

4.10 SEALING

Proper sealing arrangement shall be provided in metering system as follows:

(i) Two numbers sealing screws shall be provided on the front cover of metering module.

(ii) Provision shall be available to seal optical port.
(iii) Meter must be ultrasonically sealed between base and cover of the meter.

The sealing arrangement should be suitable for application of Polycarbonate seals.

4.11 MARKING OF METER

The marking on every meter shall be in accordance with IS 14697. The basic marking on the metering module name plate shall be as follows:

(i) Manufacturer's name and trade mark
(ii) Serial Number
(iii) Year of manufacture
(iv) Type Designation

(v) Number of phases and wires
(vi) PT commissioning information
(vii) CT commissioning information
(viii) Reference frequency
(ix) Accuracy Class

Additionally, following information shall also be available on name plate.

i) Property Of "Purchaser name"
ii) P.O. No. "Number"

4.12 The connection diagram of the connecting 3P4W meter shall be depicted via suitable sticker pasted on meter. The meter terminals shall be properly marked to identify voltage, Current, Auxiliary and communication ports.

4.13 The meters shall be suitable for being connected directly through its terminals to PTs having a rated secondary line- to- line voltage of 110 V and to CTs having a rated secondary current of 1A or 5A. Any further transformers/ transducers required for their functioning shall be in-built in the meters. Necessary isolation and/or suppression shall also be built-in, for protecting the meters from surges and voltage spikes that occur in the PT and CT circuits of extra high voltage switchyards.

4.14 The active energy measurement shall be carried out on 3 phase, 4 wire principle with an accuracy as per class 0.2s of IS14697. The meters shall compute the active energy and load import; active energy and load export from the substation bus bars during each successive 15 minute integration period block and store it in its non volatile memory.

4.15 The meter shall compute the average frequency during each successive 15-minute block and store in its memory.

4.16 The meter shall compute the reactive power on 3-phase, 4-wire principle, with an accuracy as per relevant IS/ IEC standards, and integrate the reactive energy algebraically into two separate reactive energy registers, one for the period for which the average RMS voltage is greater than 103% (Reactive High), and the other for the period for which the average RMS voltage is below 97.0% (Reactive Low) . When lagging reactive power is being sent out from substations bus bars, reactive registers shall move forward. When reactive power flow is in the reverse direction, reactive registers shall move backwards.

4.17 Further, the reactive energy shall also be available in four different registers as-

i) Reactive import while active import
ii) Reactive import while active export
iii) Reactive export while active import
iv) Reactive export while active export.

4.18 Active and Apparent energies shall also be made available by meter in separate energy registers as –

(i) Active energy Import

(ii) Active energy Export
(iii) Apparent energy (while active import)
(iv) Apparent energy (while active export)

4.19 Meter shall have provision to compute apparent energy based on lag only or lag+lead. The same shall be configured at factory end.

4.20 The meters shall be compatible with tariff as well as TOD tariff.

4.21 For reactive power and reactive energy measurement, limits of errors of all the four quadrants shall be in accordance to IEC 62053-23/ IS14697.

4.22 Each meter shall have a calibration LED (visual) for checking the accuracy of active energy measurement. Further, it shall be possible to switch over the same test output device to reactive energy via suitable means provided on the metering system. This LED shall be visible from the front side.

4.23 The metering system shall primarily work from PT supply. However, the metering system design shall have provision for auxiliary AC or DC power supply suitable for 120V DC or 230V AC.

4.24 Each metering module shall have a built-in calendar and clock, having an accuracy of + 3 (three) minute per year or better. The calendar and clock shall be correctly set at the manufacturer's works. The uncertainty of setting initial time shall not be more than + 30 seconds from Indian Standard Time as maintained by NPL New Delhi.

4.25 An automatic backup for continued operation of the meter's calendar-clock shall be provided through a long life battery, which shall be capable of supplying the required power for at least two years under meter un -powered conditions. The meters shall be supplied duly fitted with the batteries, which shall not require to be changed for at least ten years, as long as total supply interruption does not exceed two years.

4.26 TOD (Time of day registers): The meter shall have TOD registers for active energy import and export, apparent energy import and export and apparent MD import and export. Maximum eight time of day registers including universal (0-24 hrs) register can be defined. It shall be possible to program number of TOD registers and TOD timings through suitable high level software/ MRI as an authenticated transaction.

4.27 Maximum Demand (MD) Registration: The meter shall continuously monitor and calculate the average demand of configured parameter during the integration period set and the maximum, out of these shall be stored along with date and time when it occurred in the meter memory. The maximum demand shall be computed on fixed block principle. The maximum registered value shall be made available in meter readings. The integration period shall be set as 15 minutes that shall be capable to change to other integration period (30/ 60 minutes), if required, through suitable high level software/ MRI as an authenticated transaction.

4.28 Maximum Demand Reset: Following provisions shall be available for MD reset in meter

i) Auto billing at predefined date and time
ii) Manual via common MD reset button (optional)
iii) Authenticated transaction through suitable high level software/ MRI (optional)

4.29 The display shall be of Graphical LCD type with colored back-lit and soft push button. Individual display shall be provided for all the meters housed in a metering rack.

The display shall indicate direct values (i.e. without having to apply any multiplying factor) of measured/ computed parameters as per the meter commissioning. It should be possible to easily identify the single or multiple displayed parameters through legends on the metering system display like OBIS codes etc.

The register shall be able to record and display starting from zero, for a minimum of 1500 hours, the energy corresponding to rated maximum current at reference voltage and unity power factor. The register shall not roll over in between this duration.

4.30 Each of the metering module shall display on demand & in Auto scroll mode the following quantities/ parameters:

(i) LCD segment check

(ii) Date

(iii) Time

(iv) Voltage (Vr,Vy,Vb)

(v) Current (Ir,Iy,Ib)

(vi) Three Phase Power Factor

(vii) Instantaneous Load

(viii) Instantaneous Frequency
(ix) Cumulative active energy import
(x) Cumulative active energy export
(xi) Bill Point Active Energy Import
(xii) Bill Point Active Energy Export
(xiii) Cumulative net active (Import – Export) energy
(xiv) Cumulative reactive energy lag while active import
(xv) Cumulative reactive energy lead while active import
(xvi) umulative reactive energy lag while active export
(xvii) Cumulative reactive energy lead while active export
(xviii) Cumulative apparent energy (while active import)
(xix) Cumulative apparent energy (while active export)
(xx) Bill Point apparent energy (while active import)
(xxi) Bill Point apparent energy (while active export)
(xxii) Cumulative Reactive High energy
(xxiii) Cumulative Reactive Low energy
(xxiv) Last 15 minutes block average of active import energy
(xxv) Last 15 minutes block average of active export energy
(xxvi) Last 15 minutes block average of the net active (Import – Export) energy
(xxvii) Last 15 minutes block average frequency
(xxviii) MD reset count

(xxix) Maximum demand apparent (while active import) for current month (0-24 hrs)
(xxx) Maximum demand apparent (while active export) for current month (0-24 hrs)
(xxxi) Bill Point Maximum demand apparent (while active import) for current month (0-24 hrs)
(xxxii) Bill Point Maximum demand apparent (while active export) for current month (0-24 hrs)
(xxxiii) TOD Active Energy Cumulative
(xxxiv) Bill Point TOD Active Energy
(xxxv) Present tamper status
(xxxvi) Date of first occurrence of tamper
(xxxvii) Time of first occurrence of tamper
(xxxviii) Time of last restoration of tamper
(xxxix) Date of last restoration of tamper
(xl) Total tamper count
(xli) Cover Open Tamper Status along with date and time

There should be a facility to configure the display parameters in favorite pages.

4.31 Load Survey: Each metering module shall have a non-volatile memory in which the following shall be automatically stored for each successive fifteen (15) minute block:

i) Active import
ii) Active export
iii) Average frequency
iv) Apparent while active import
v) Apparent while active export
vi) Reactive High energy (V>103%)
vii) Reactive Low energy (V<97%)

15-minute average of the above parameters shall be available for minimum last thirty five (35) days. Meter memory is required for 35days minimum so that data for one calendar month can be downloaded at a time. It shall be possible to select either energy or demand view at Base Computer Software (BCS) end. The load survey data should be available in the form of bar charts as well as in spreadsheets. The BCS shall have the facility to give complete time synchronized load survey data both in numeric and graphic form.
Billing parameters: The predefined date and time for registering the billing parameters of shall be 00.00 hours of the first day of each calendar (billing) month. Each meter shall store the following parameters corresponding to defined bill dates for up to last six (6) months:

i) Active energy import
ii) Active energy export
iii) Apparent energy (while active import)
iv) Apparent energy (while active export)
v) Maximum demand Apparent (while active import)
vi) Maximum demand Apparent (while active export)
vii) Daily midnight parameters: The metering modules shall store following end day parameters for last thirty five (35) days:

- Active energy import
- Active energy export
- Reactive high energy
- Reactive low energy

4.32 Data Communication Capability:

a) The metering system should have suitable communication ports for local reading, remote and on-line communication facilities like telemetry etc.

b) Each metering module shall have an optical galvanically isolated serial communication (in the form of 1107 port) & USB port on its front for tapping all the data stored in its memory. Meter reading instrument (MRI) shall be used for the purpose of local meter reading via this optical communication port and Pen drive for USB port. MRI shall serve as the interface between meters and PC loaded with Base Computer Software. It shall also be possible to download meter data via this port by connecting laptop computer directly. The overall intention is to have the local ports is to tap the data stored in meter once in a week/month and transmit the same to PC with BCS for view. The metering system shall further provide a serial RS232, RS485 and Ethernet communication port for remote data transfer to a central location. This port shall be capable of data transfer to a remote computer over suitable communication media (GPRS/VSAT/ Leased line/ OFC) using suitable communication hardware (modems/ multiplexer/ communication cables etc.) as required for proper functioning of remote meter reading scheme.

c) Each meter shall have a unique identification code i.e. serial number, which shall be marked on name plate as well as in its memory. Further all meters of the same model shall be totally identical in all respects except for their unique identification codes.

d) The meters shall safely withstand the usual fluctuations arising during faults etc. In particular, 115% of rated PT secondary voltage applied continuously and 190% of rated voltage applied for 3.0 seconds, and 20 times of rated CT secondary current applied for 0.5 seconds shall not cause any damage to or malfunctioning of the meters. Further the immunity of metering system to external magnetic field shall be as per latest CBIP recommendations.

e) Each meter shall have a non volatile memory in which the parameters as mentioned in this specification shall be stored. The non volatile memory shall retain the data for a period not less than 10 years under un-powered condition; battery back up memory shall not be treated as NVM.

f) Meter shall have the capability and facility to compensate for errors of external measurement transformers i.e. CT and PT:

g) Linear compensation for measurement of PT errors (ratio and phase); there shall be linear adjustment which shall be applied across the complete measurement range of the transformer.

h) Non-linear compensation for measurement of CT errors (ratio and phase) compensation; this shall allow multiple ratio and phase adjustments to be applied for different load points per phase input of the meter.

i) It should be possible to program the errors of CT and PT in meter through front optical communication port using compatible high level software. Metering

system design should support this feature and further it shall be possible to configure & incorporate this feature in meter at later stage whenever required.

j) The meter display should depict the total harmonic distortion (THD) of current and voltages up to 31st level of power quantity for providing the feature of supply monitoring to Utility.

4.33 TAMPER DETECTION FEATURES:

a) The meter shall have features to detect and log the occurrence and restoration of following tampers, along with date and time of event:

i. Phase wise Missing Potential – The meter shall detect missing potential (1 or 2 phases) provided the line current is above a specified threshold. The voltage at that stage would be below a specified threshold.

ii. Phase wise Current Circuit Reversal – The meter shall detect reversal of polarity provided the current terminals are reversed. This shall be recorded for 1 or 2 phase CT reversal.

iii. Voltage Unbalance – The meter shall detect voltage unbalance if there is unbalance in voltages.

iv. Current Unbalance – The meter shall detect current unbalance if there is unbalance in load conditions. Meter should ensure true system conditions before going for current unbalance checks.

v. CT Miss – The meter shall detect current miss if the current is below a defined threshold, provided the phase voltage is above a specified threshold.

vi. Non rollover events like the "Meter Cover Open" tamper with date and time stamp.

vii. Influence of permanent magnet or ac/dc electromagnet.

viii. Neutral disturbance

b) Snapshots of phase wise voltage, phase wise active current and phase wise power factor shall be provided with above specified tamper events.

c) Further, each meter module shall record the following events along with total duration:

Power On/Off – The meter shall detect power off if both the auxiliary supplies fail. The event shall be recorded on the next power up. At the same time power on event shall be recorded. No snapshot shall be logged with this event.

d) Feeder Supply Fail -This event shall be logged when feeder supply, i.e. all the voltages goes below certain threshold. No snapshot shall be logged with this event

e) Last two hundred (200) events (occurrence + restoration), in total, shall be stored in the meter memory on first in first out basis.

f) There shall be five separate compartments for logging of different type of tampers:

i. Once one or more compartments have become full, the last tamper event pertaining to the same compartment shall be entered and the earliest (first one) tamper event should disappear. Thus, in this manner each succeeding tamper event shall replace the earliest recorded event, compartment wise. Events of one compartment/

category should overwrite the events of their own compartment/ category only. In general, persistence time of 5 min. for occurrence and restoration respectively need to be supported in meter.

ii. Tamper count should increase as per occurrence (not restoration) of tamper events. Total no. of counts shall be provided on BCS.

Compartment No.1	50 events of Missing Potential
Compartment No.2	50 events of CT Reversal
Compartment No.3	25 events for Power Failure / Power On-Off
Compartment No.4	75 events of Transaction related and other tampers as per IS:15959 Category B

4.34 TRANSACTIONS

The meter shall record critical events (as performed in authenticated manner) of Time set, MD reset operation and tariff change. These events shall be logged in roll over mode for up to twenty numbers.

4.35 SELF DIAGNOSTIC FEATURE

The meter shall be capable of performing complete self diagnostic check to monitor the circuits for any malfunctioning to ensure integrity of data in memory location all the time. The meter shall have indications for unsatisfactory/ nonfunctioning/ malfunctioning of the following:

I. Non volatile memory
II. RTC battery
III. The above malfunctioning should be flagged in the meter memory and should be made available in meter reading data.

4.36 TYPE TEST CERTIFICATES

The meters shall be fully type tested as per relevant standards IS 14697. The type test report of the meters shall be submitted by bidder along with the offer. Type test reports shall not be more than 2 years old.

GTP-14: Trivector Meter

Sl. No.	Parameter	Unit	Requirement	Bidder Remarks
1	TOD Registers – No. of Slots	No.	Max 8 (including universal)	
2	TOD Parameters Covered	—	kWh, kVAh, MD (Import/Export)	
3	TOD Programmability	—	Through authenticated software/MRI	
4	TOD Timing Configuration	—	Programmable	
5	Maximum Demand Type	—	Block Demand	
6	MD Integration Period	min	15 (configurable to 30/60)	
7	MD Storage	—	With Date & Time stamp	
8	MD Reset – Auto	—	Yes (predefined date/time)	
9	MD Reset – Manual	—	Optional	
10	MD Reset – Software	—	Yes (authenticated)	
11	Display Type	—	Graphical LCD, backlit	
12	Display Mode	—	Auto scroll + On demand	
13	OBIS Code Indication	—	Yes	
14	Display Values	—	Direct (no MF required)	
15	Register Capacity	Hours	≥1500 hrs at full load	
16	Register Rollover	—	No rollover within capacity	
17	Voltage Display	V	Vr, Vy, Vb	
18	Current Display	A	Ir, Iy, Ib	
19	Power Factor Display	—	3-phase PF	
20	Frequency Display	Hz	Yes	
21	Instantaneous Load	kW/kVA	Yes	
22	Active Energy Import	kWh	Cumulative	
23	Active Energy Export	kWh	Cumulative	
24	Billing Energy Import	kWh	Yes	
25	Billing Energy Export	kWh	Yes	
26	Net Energy	kWh	Import – Export	
27	Reactive Energy (Lag)	kVARh	Yes	
28	Reactive Energy (Lead)	kVARh	Yes	
29	Date & Time Display	—	Yes	
30	LCD Segment Test	—	Yes	

TECHNICAL SPECIFICATION NO - A16
ROOFTOP SOLAR PV PLANT

1) SITE DETAILS:

i) Location: Moran Power station, OIL, Moran
ii) Location Co-ordinates: 27.14806° N, 94.89562° E
Iii) Available area: (33 * 25) meter

2) SOLAR PV MODULE

(a) The PV modules shall be purchased from class-I local supplier. Bidder shall comply with latest MNRE Notification regarding Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirement for Compulsory Registration) Order, 2019 and its amendments issued time to time.

(b) The PV modules used must qualify to the latest edition of IEC standards or equivalent BIS standards, i.e. IEC 61215/IS14286, IEC 61853-Part I/IS 16170-Part I, IEC 61730 Part-1 &Part 2 and IEC 62804 (PID). For the PV modules to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701.

(c) The temperature co-efficient power of the PV module shall be equal to or better than – 0.40%/°C.

(d) Solar PV modules of minimum capacity 540 Wp to be used with yearly degradation factor not more than 0.7%.

(e) The PV Module efficiency should be minimum 21%.

(f) Solar PV module shall have valid BIS registration.

(g) All electrical parameters at STC shall have to be provided.

(h) The PV modules shall be equipped with IP 65 or better protection level junction box with required numbers of bypass diodes of appropriate rating and appropriately sized output power cable of symmetric length with MC4 or equivalent solar connectors.

(i) Solar PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

(j) If module(s) fail(s) to exhibit such power output in the prescribed time span, the Contractor will either deliver additional PV Module(s) to compensate the missing power output for complete period of 25 years with no change in area of land / rooftop used or replace the PV Module(s) with no change in area of land/rooftop used at Owner's sole option.

(k) The bidder should get a material warranty from the manufacturer for the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than ten (10) years from the date of purchase which shall not be before the date of LOA.

(l) Defects and/or failures due to manufacturing.

(m) Defects and/or failures due to quality of materials.

(n) Nonconformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option.

(o) PV modules must be tested and approved by one of the NABL accredited and BIS approved test centers.

(p) Modules deployed must use a RF identification tag laminated inside the glass. The following information must be mentioned in the RFID used on each module:

(i) Name of the manufacturer of the PV module
(ii) Name of the manufacturer of Solar Cells.
(iii) Month & year of the manufacture (separate for solar cells and modules)
(iv) Country of origin (separately for solar cells and module)
(v) I-V curve for the module Wattage, Im, Vm and FF for the module
(vi) Unique Serial No and Model No of the module
(vii) Date and year of obtaining IEC PV module qualification certificate.
(viii) Name of the test lab issuing IEC certificate.
(ix) Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001.
(x) Nominal wattage +3%
(xi) Brand Name, if applicable.

(q) Unique Serial No, Model No, Name of Manufacturer, Manufacturing year, Make in India logo and module wattage details should be displayed inside the laminated glass.

(r) The modules shall be fitted with water syphoning arrangement wherever necessary to prevent water stagnation on the bottom modules.

(s) The PV cells in a crystalline silicon module shall be protected by encapsulation between front glass and back sheet/back glass. The glass shall be made of high transmissivity, and front surface shall give high encapsulation gain.

(t) Bidder shall submit Self-certified Electro- Luminescence (EL) Test reports of all the Crystalline Silicon based PV Modules being offered to OIL.

3) Inverter/PCU:

(a) Inverters/PCU should be purchased from Class I supplier and shall comply with applicable IEC/equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683, IS 16221 (Part 2), IS 16169 and IEC 60068-2(1,2,14,30) /Equivalent BIS Std.

(b) Maximum Power Point Tracker (MPPT) shall be integrated in the inverter/PCU to maximize energy drawn from the array. Charge controller (if any) / MPPT units environmental testing should qualify IEC 60068-2(1, 2, 14, 30)/Equivalent BIS standard. The junction boxes/enclosures should be IP 65 or better (for outdoor)/ IP 54 or better (indoor) and as per IEC 529 Specifications.

(c) All inverters/PCUs shall be IEC 61000 compliant for electromagnetic compatibility, harmonics, Surge, etc. PCU/inverter should also be DG set interactive. The PCU shall have a minimum comprehensive warranty of 10 years.

1. The PCU/ inverter shall have an overloading capacity of minimum 20%.
2. Typical technical features of the inverter shall be as follows-
3. Switching devices: IGBT/MOSFET
4. Control: Microprocessor/DSP
5. Nominal AC output voltage and frequency: as per CEA/State regulations
6. Output frequency: 50 Hz
7. Grid Frequency Synchronization range: as per CEA/State Regulations
8. Ambient temperature considered: -20°C to 60°C
9. Humidity: 95 % non-condensing
10. Protection of Enclosure: IP-54 (Minimum) for indoor and IP-65(Minimum) for outdoor.
11. Grid Frequency Tolerance range: as per CEA/State regulations
12. Grid Voltage tolerance: as per CEA/State Regulations
13. No-load losses: Less than 1% of rated power
14. Inverter efficiency (Min.): >93% (In case of 10 kW or above with in-built galvanic isolation)
    Inverter efficiency (Min.): >97% (In case of 10 kW or above without inbuilt galvanic isolation)
    nverter efficiency (Min.): > 90% (In case of less than 10 kW)
15. THD: < 3%
16. PF: > 0.9 (lag or lead)
17. Should not inject DC power more than 0.5% of full rated output at the interconnection point and comply to IEEE 519.
18. The PCU / inverter shall have a minimum comprehensive warranty of 10 years from the date of purchase which shall not be before the date of LOA.
19. The PCU/Inverter shall be capable of controlling power factor dynamically. PCU/inverter should be equipped with components required to support reactive power.

(d) The output power factor of inverter should be suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustain fault in feeder line and against the lightning on feeder.

(e) All the Inverters should contain the following clear and indelible Marking Label & Warning Label as per IS16221 Part II, clause 5. The equipment shall, as a minimum, be permanently marked with:

(f) The name or trademark of the manufacturer or supplier.

1. A model number, name or other means to identify the equipment,
2. A serial number, code or other marking allowing identification of manufacturing location and the manufacturing batch or date within a three-month time period.
3. Input voltage, type of voltage (a.c. or d.c.), frequency, and maximum continuous current for each input.
4. Output voltage, type of voltage (a.c. or d.c.), frequency, maximum continuous current, and for a.c. outputs, either the power or power factor for each output.
5. The Ingress Protection (IP) rating

(g) Marking shall be located adjacent to each fuse or fuse holder, or on the fuse holder, or in another location provided that it is obvious to which fuse the marking applies, giving the fuse current rating and voltage rating for fuses that may be changed at the installed site.

(h) Inverter shall be connected to 3 phase, 415 V system of the substation.

(i) Inverter/PCU shall be capable of complete automatic operation including wake-up, synchronization & shutdown

(j) Inverter data and shall be connected to the remote monitoring system through RS 485 communication for local monitoring by shift personnel and provision shall be available for transmitting the data to remote location.

(k) Integration of PV system with Grid & Grid Islanding:

(i) The output power from SPV would be fed to the inverters/PCU which converts DC produced by SPV array to AC and feeds it into the main electricity grid at 415 V after synchronization.

(ii) In the event of a power failure of the LT switchgear panel, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as “islands.” Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection), disconnection due to under and over voltage conditions shall also be provided, if not available in inverter.

(iii) MCB/MCCB or a manual isolation switch, besides automatic disconnection to grid, would have to be provided to isolate the connection

by the personnel to carry out any maintenance. This switch shall be locked by the personnel.

(l) PCU front panel shall be provided with display (LCD or equivalent) to monitor the following:

1. DC power input
2. DC input voltage
3. DC current
4. AC output power
5. AC voltage (all the 3 phases)
6. AC current (all the 3 phases)

(m) Protection required in Inverter (minimum)

1. Input side disconnection switch
2. Earth leakage /Ground fault monitoring
3. DC reverse polarity protection
4. DC over voltage / current limitation protection
5. AC short circuit/Earth fault protection
6. AC over voltage / current limitation protection
7. DC and AC side surge protection (MOV)in built
8. Anti- islanding protection

(n) The PCU shall have arrangement for adjusting DC input current and should trip against sustainable fault downstream and shall not start till the fault is rectified.

(o) The PCU shall be able to withstand an unbalanced load conforming to IEC standard and relevant electricity condition. The PCU shall include appropriate self-protective and self-diagnostic features to protect itself and the PV array from damage in the event of PCU component failure or from parameters – beyond the PCU's safe operating range due to internal or external causes.

(p) PCU shall go to shutdown/standby mode, with its contacts open, under the following conditions before attempting an automatic restart after an appropriate time delay.

(q) When the power available from the PV array is insufficient to supply the losses of the PCU, the PCU shall go to standby/shutdown mode.

(r) The PCU control shall prevent excessive cycling of shut down during insufficient solar irradiance.

4) Module Mounting Structure (MMS):

(a) Supply, installation, erection, and acceptance of module mounting structure (MMS) with all necessary accessories, auxiliaries and spare part shall be in the scope of the work.

(b) The design calculations shall be supplemented with neat sketch and reference to various clauses of technical specification and Indian standards.

(c) Module mounting structures can be made from three types of materials. They are Hot Dip Galvanized Iron, Aluminium and Hot Dip Galvanized Mild Steel (MS). However, MS will be preferred for raised structure.

(d) MMS Steel shall be as per latest IS 2062:2011 and galvanization of the mounting structure shall be in compliance of latest IS 4759. MMS Aluminium shall be as per AA6063 T6. For Aluminium structures, necessary protection towards rusting need to be provided either by coating or anodization.

(e) All bolts, nuts, fasteners shall be of stainless steel of grade SS 304 or hot dip galvanized, panel mounting clamps shall be of aluminium and must sustain the adverse climatic conditions. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts.

(f) Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame and associated fasteners, nuts & bolts.

(g) The upper edge of the module must be covered with wind shield so as to avoid build air ingress below the module. Slight clearance must be provided on both edges (upper & lower) to allow air for cooling.

(h) Suitable fastening arrangements such as grouting and calming should be provided to secure the installation against the specific wind speed. The bidder shall be fully responsible for any damage to SPV System caused due to high wind velocity within guarantee period as per technical specification.

(i) The structures shall be designed to allow easy replacement, repairing and cleaning of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels. Necessary testing provision for MMS to be made available at site.

(j) Adequate spacing shall be provided between two panel frames and rows of panels to facilitate personnel protection, ease of installation, replacement, cleaning of panels and electrical maintenance.

(k) The structure shall be designed to withstand operating environmental conditions for a minimum period of 25 years.

(l) Module Mounting Structures shall be designed as per IS 875 part III. Basic wind speed shall be as per IS 875 (Part 3) based on survey of India Political map printed in 2002 and its latest editions.

(m) No welding is allowed on the mounting structure.

(n) Mounting of Solar PV over the rooftop of the E-house shall be designed to completely nulify the possibility of water leakage due to installation of SPV.For metallic roof structure, following points shall be considered:

(o) The structure design should be as per the slope of the metallic roof.

(p) Minimum thickness of the structural members shall be 2mm.

(q) Fixing of module mounting structures shall not cause any damage to the roof. The roof should remain waterproof.

(r) A proper walkway and lifeline shall be provided.

(s) The inclination angle of structure can be done in two ways:

(i) With same tilt angle based on the slope of roof to get the maximum output.

(ii) The base of structure should be connected on the Purlin of roof with the proper fastening arrangement.

5) METERING:

A Roof Top Solar (RTS) Photo Voltaic (PV) system shall consist of following energy meters:

(a) Generation Solar meter(s):

(i) To keep record for total generation of the plant at each termination. The solar meter shall be having warranty for a minimum period of 10 years.

(ii) The installation of meters including CTs & PTs, wherever applicable, shall be carried out by the bidder as per the terms, conditions and procedures laid down by CEA/AERC.

(iii) Solar energy meters shall be connected for online monitoring at local workstation. Provision for future data transmission shall also be provided.

(iv) In case access to the generation solar meter is not available for remote metering, another energy meter shall be provided for remote metering.

(b) Array Junction Boxes:

(i) The junction boxes are to be provided in the PV array for termination of connecting cables. The Junction Boxes (JBs) shall be made of GRP/FRP/Powder Coated aluminum /cast aluminum alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JBs shall be such that input & output termination can be made through suitable cable glands. Suitable markings shall be provided on the bus-bars for easy identification and cable ferrules will be fitted at the cable termination points for identification.

(ii) Copper bus bars/terminal blocks housed in the junction box with suitable termination threads Conforming to IP 65 or better standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry, Single /double compression cable glands should be provided.

(iii) Polyamide glands and MC4 Connectors may also be provided. The rating of the junction box shall be suitable with adequate safety factor to interconnect the Solar PV array.

(iv) Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.

(v) Junction boxes shall be mounted on the MMS such that they are easily accessible and are protected from direct sunlight and harsh weather.

6) DC Distribution Box (DCDB):

(a) May not be required for small plants, if suitable arrangement is available in the inverter.

(b) DC Distribution Box are to be provided to receive the DC output from the PV array field.

(c) DCDBs shall be dust & vermin proof conform having IP 65 or better protection, as per site conditions.

(d) The bus bars are made of EC grade copper of required size. Suitable capacity MCBs/MCCB shall be provided for controlling the DC power output to the inverter along with necessary surge arrestors. MCB shall be used for currents up to 63 Amperes, and MCCB shall be used for currents greater than 63 Amperes.

(e) AC Distribution Box (ACDB):

(i) AC Distribution Panel Board (DPB) shall control the AC power from inverter, and should have necessary surge arrestors, if required. There is interconnection from ACDB to mains at LT Bus bar while in grid tied mode.

(ii) All switches and the circuit breakers, connectors should conform to IEC 60947:2019, part I, II and III/ IS 60947 part I, II and III.

(iv) The isolators, cabling work should be undertaken as part of the project.

(v) All the Panels shall be metal clad, totally enclosed, rigid, floor mounted, air -insulated, cubical type suitable for operation on 1-ϕ/3-ϕ, 415 or 230 volts, 50 Hz (or voltage levels as per CEA/AERC regulations).

(f) The panels shall be designed for minimum expected ambient temperature

of 45 degree Celsius, 80 percent humidity and dusty weather.

(g) All indoor panels will have protection of IP 54 or better, as per site conditions. All outdoor panels will have protection of IP 65 or better, as per site conditions.

(h) Should conform to Indian Electricity Act and CEA safety regulations (till last amendment).

(i) All the 415 or 230 volts (or voltage levels as per CEA/State regulations) AC devices / equipment like bus support insulators, circuit breakers, SPDs, Voltage Transformers (VTs) etc., mounted inside the switchgear shall be suitable for continuous operation and satisfactory performance under the following supply conditions.

(j) Variation in supply voltage: as per CEA/AERC regulation

(k) Variation in supply frequency: as per CEA/AERC

(l) The inverter output shall have the necessary rated AC surge arrestors, if required, and MCB/ MCCB. RCCB shall be used for successful operation of the PV system, if inverter does not have required earth fault/residual current protection.

7) CODE AND STANDARDS:

IS	Details
IEC 60947/ IS13947	Low-voltage switchgear and control gear
IS 2705	Current Transformers
IS 3043	Code of practice for earthing.
IS 3072	Code of practice for installation and maintenance of Switchgear
IS 3156	Voltage Transformers
IS 3202	Code of practice for climate proofing of electrical equipment.
IS 3231	Electrical relays for power system protection.
IS 13703 /IEC 60269	HRC Cartridge fuses
IS 10118 (4 parts)	Code of practice for selection, installation and maintenance of switchgear and control gear.
IEC 60255	Electrical Relays

8) PROTECTIONS:

The system should be provided with all necessary protections like earthing, Lightning, and Surge Protection as per CEA Safety regulations 2023 as described below.

1) Earthing Protection: The earthing shall be done in accordance with latest Standards. This specification is intended to outline the requirement of earthing for Solar Array (DC Side) and AC power block side of Solar PV Plant. It is not the intent of the specification to specify all details of design and construction since the bidder

has full responsibility for engineering and implementation of earthing system meeting the functional requirement. Any additional equipment, material, services which are not mentioned herein but are required for installation, testing and commissioning of earthing system for safe and satisfactory operation of plant shall be included under scope of the bidder.

2) Each array structure of the PV yard, Low Tension (LT) power system, earthing grid for switchyard, all electrical equipment, inverter, all junction boxes, etc. shall be grounded properly as per IS 3043-2018.

3) Metallic frame of all electrical equipment shall be earthed by two separate and distinct connections to earthing system, each of 100% capacity.

4) Lightning Protection:

- ✓ The SPV power plants shall be provided with lightning & over voltage protection, if required. The main aim in this protection shall be to reduce the overvoltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc.
- ✓ The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors (Las). Lightning protection should be provided as per NFC17-102:2011/IEC 62305 standard.
- ✓ Lightning Mast / conductor, placed at strategic locations, shall be used to protect the arrays against lightning protection.
- ✓ The protection against induced high-voltages shall be provided by the use of Metal Oxide Varistors (MOVs)/Franklin Rod type LA/Early streamer type LA.

5) Surge Protection

Internal surge protection, wherever required, shall be provided. It will consist of three SPD type-II/MOV type surge arrestors connected from +ve and –ve terminals to earth.

9) CABLES

1) All cables should be of the latest edition of IEC/equivalent BIS Standards (ISI marked) along with IEC 60227/IS 694, IEC 60502/IS 1554 standards.

2) Cables should be flexible and should have good resistance to heat, cold, water, oil, abrasion etc.

3) Armored cable should be used and overall PVC type 'A' pressure extruded insulation or XLPE insulation should be there for UV protection.

4) Cables should have Multi Strand, annealed high conductivity copper conductor on DC side and copper/FRLS type Aluminum conductor on AC side. For DC cabling, multi-core cables shall not be used.

5) Cables should have operating temperature range of 0°C to +80°C and voltage rating of 1000 V.

6) Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop less than 2% (DC Cable losses).

7) The size of each type of AC cable selected shall be based on minimum voltage drop. However, the maximum drop shall be limited to 2%

8) The electric cables for DC systems for rated voltage of 1500 V shall conform to BIS 17293:2020.

9) All cable/wires are to be routed in a RPVC pipe/ GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable is easily identified.

10) All cable trays including covers to be provided.

11) The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25 years.

10) DRAWINGS & MANUALS:

1. Operation & Maintenance manual/user manual, Engineering and Electrical Drawings shall be supplied along with the power plant.
2. The manual shall include complete system details such as array lay out, schematic of the system, inverter details, working principle etc.
3. The Manual should also include all the Dos & Don'ts of Power Plant along with Graphical Representation with indication of proper methodology for cleaning, Operation and Maintenance etc.
4. Step by step maintenance and troubleshooting procedures shall also be given in the manuals.

11) Data Monitoring:

1. Bidders should also educate the consumers during their O&M period.Data monitoring of inverters, solar meters and Pyranometer shall be done at the local work station.
2. Software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be supplied by the supplier. Provision for interfacing this data on any other Agency server shall be kept.
3. Measurement of Solar PV parameters at Inverter level: These Inverter parameters shall have provision of data logging through Mod Bus (RS-485) protocol.
4. Solar Irradiance: An integrating Pyranometer (Class II or better) shall be provided, with the sensor mounted on a Horizontal plane at a shadow free suitable location near solar arrays at one of the Roof Top within premises. The pyranometer shall be connected to data acquisition system of the substation.
5. Temperature: Temperature probes for recording the PV Cell temperature shall be provided at one of the modules at shadow free area at one of the Roof Top within premises.

12) Safety measures:

Electrical safety of the installation(s) including connectivity with the grid must be taken into account and all the safety rules & regulations applicable as per Electricity Act, 2003 and CEA Safety Regulation 2023 etc. or its latest amendments must be followed. Danger boards, Caution Boards should be provided as and where necessary as per IE Act /IE rules as amended up to date.

Quality Certification, Standards and Testing for Grid-Connected Solar PV Systems/Power Plants

Solar PV Modules/Panels

IEC 61215 and IS 14286	Design Qualification and Type Approval for Crystalline Silicon Terrestrial Photovoltaic (PV) Modules
IEC 61701:2011	Salt Mist Corrosion Testing of Photovoltaic (PV) Modules
IEC 61853- 1:2011 / IS 16170-1:2014	Photovoltaic (PV) module performance testing and energy rating –: Irradiance and temperature performance measurements, and power Rating.
IEC 62716	Photovoltaic (PV) Modules – Ammonia (NH3) Corrosion Testing (as per the site condition like dairies, toilets etc)
IEC 61730-1,2	Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction, Part 2: Requirements for Testing
IEC 62804	Photovoltaic (PV) modules – Test method for detection of potential induced degradation. IEC 62804-1: Part 1: Crystalline Silicon
Solar PV Inverters	
IEC 62109 or IS : 16221	Safety of power converters for use in photovoltaic power systems – Part 1: General requirements, and Safety of power converters for use in photovoltaic power systems Part 2: Particular requirements for inverters. Safety compliance (Protection degree IP 65 or better for outdoor mounting, IP 54 or better for indoor mounting)
IS/IEC 61683 latest (as applicable)	Photovoltaic Systems – Power conditioners: Procedure for Measuring Efficiency (10%, 25%, 50%, 75% & 90-100% Loading Conditions)
IEC 60068-2 /IEC 62093 (as applicable)	Environmental Testing of PV System – Power Conditioners and Inverters
IEC 62116:2014/ IS16169	Utility-interconnected photovoltaic inverters – Test procedure of islanding prevention measures

GTP-15: Rooftop Solar Plant

Sl. No.	Parameter	Requirement (As per Tender)	Bidder's Response
1	Make	To be specified by bidder	
2	Model	To be specified by bidder	
3	PV Module Capacity	Minimum 540 Wp	
4	PV Module Efficiency	Minimum 21%	
5	Temperature Coefficient (Pmax)	≤ -0.40 %/°C	
6	Annual Degradation	≤ 0.7% per year	
7	Module Standards	IEC 61215 / IS 14286, IEC 61730, IEC 62804, IEC 61701, BIS Certified	
8	Module Warranty	90% at 10 years, 80% at 25 years	
9	Inverter Type	Grid-tied inverter with MPPT	
10	Inverter Efficiency	≥ 97% (for ≥10 kW, transformerless)	
11	Inverter Warranty	Minimum 10 years	
12	AC Voltage	415 V, 3-phase, 50 Hz	
13	THD	< 3%	
14	Anti-Islanding Protection	As per IEC 62116 / IS 16169	
15	Mounting Structure	HDGI / Aluminium / MS as per IS standards	
16	Design Life of MMS	Minimum 25 years	
17	Meters	Generation meter (solar meter), provision for remote metering if required	
18	Earthing	As per IS 3043 with two separate earth connections	
19	Lightning Protection	As per IEC 62305 / NFC 17-102	
20	DC Cables	Copper, UV resistant, 1000/1500 V, ≤2% voltage drop	
21	AC Cables	Copper/Aluminium, FRLS, ≤2% voltage drop	
22	Monitoring	RS-485 / Modbus based monitoring with remote access provision	
23	Pyranometer	Class II or better	
24	Safety Compliance	As per CEA Safety Regulations 2023	

TECHNICAL SPECIFICATION NO - A17
FIRE DETECTION & PROTECTION

SCOPE:

Design, engineering, supply, installation, testing, commissioning and integration of a complete Fire Detection, Alarm & Control System, with necessary interfacing to the Air-Conditioning and Ventilation System and surveillance/monitoring system, for reliable detection, alarm, control and safety of personnel and equipment of E-house.

The detailed fire detection scheme, device selection, zoning philosophy and system architecture shall be designed by the OEM/System Integrator in accordance with applicable national and international fire safety standards and manufacturer's best practices.

1.0 Fire Detection & Alarm System

1. The system shall comprise an intelligent / addressable Fire Alarm Control Panel (FACP) with LCD display, event logging, fault diagnostics and provision for future expansion.
2. The system shall cover complete indoor and outdoor equipment of the E-house which includes MV switchgear room, Battery Room, Transformer Room, Control room, Conference Hall, office room, Cable trench etc.
3. The Fire detection system shall have operating source from the existing DC power supply of the substation.
4. The system shall be suitable for multi-area / multi-zone detection, monitoring and control.
5. Fire detection shall include, but not be limited to:

a. Multi-sensor smoke detectors / heat detectors, as appropriate for the protected area
b. Manual Call Points (break-glass type) at strategic locations
c. Audio-visual alarm devices (hooters/sounders with flashing beacons), suitable for indoor and outdoor installation

6. Detector spacing, zoning, mounting height and alarm audibility shall comply with applicable fire standards.

2.0 Control & Interfacing

1. The Fire Alarm System shall be provided with potential-free contacts / communication interfaces for integration with other systems.
2. On detection of fire in any area, the FACP shall automatically:

a. Generate audible and visual alarms
b. Shut down the Air-Conditioning and Ventilation system of the affected zone/room to prevent spread of smoke and fire
c. Provide alarm/status signals to the surveillance or central monitoring system, if applicable

3. Manual override and reset facilities shall be provided at the fire alarm panel.

3.0 Cabling & Installation

1. All fire alarm cabling shall be laid in dedicated conduits/trays, segregated from power, control and communication circuits.
2. Cables shall be FRLS copper cables, suitable for fire alarm applications and compliant with relevant standards.
3. Installation shall ensure mechanical protection, neat routing and clear identification of circuits.

4.0 Firefighting Equipment

1. CO_2 type fire extinguishers of minimum capacity of 6.5 kg and minimum quantity 20 Nos. each shall be provided at entrances and other critical locations inside/ outside, suitable for electrical fires.
2. Stored type DCP fire extinguishers of capacity 9 kg and minimum quantity 20 Nos. shall be provided at inside/ outside/fire extinguishers shed near the entrance area.
3. All the inside fire extinguishers shall be suitably clamped on the wall/partition of the proposed structure.
4. The minimum quantity for fire extinguishers placement shall be done in accordance with IS 2190/ CEA guidelines or any applicable code or as advised by OIL. The layout must be approved by Oil India Limited before supply & installation.
5. The approved make of Fire Extinguishers shall be Ceasefire Industries/ Kanex Fire/ Minimax Fire Safety only.
6. Sufficient spares for maintenance & filling of Fire Extinguishers shall be provided during the time of inspection.
7. Nitrogen filling adaptor for DCP type fire extinguishers shall be provided suitable for refilling.
8. Fire Extinguisher stand of metal or polymer based to be supplied for the fire extinguishers which are not directly hanged on the wall.
9. Hydrotest & other test certificate shall be provided for fire extinguishers.

5.0 Standards & Compliance

1. The complete system shall be designed, supplied and installed in compliance with:

a. Relevant Indian Standards (IS) and/or NFPA / EN standards, as applicable
b. Manufacturer's installation and commissioning guidelines

2. All equipment shall be type-tested, reliable and sourced from reputed OEMs

6.0 Testing, Commissioning & Documentation

1. The contractor/OEM shall carry out complete testing and commissioning, including functional tests of detection, alarm, AC shutdown and interlocks.
2. As-built drawings, cause & effect matrix, operating manuals and test certificates shall be submitted.
3. Training shall be provided to operating personnel on system operation, routine checks and emergency response.

7.0 Marking:

1. Appropriate exit markings shall be provided inside the substation for clear identification of escape routes.

2. Photoluminescent (luminant) tape/markings shall also be installed to ensure visibility during power failure or low-light conditions.
3. The Evacuation Plan, Emergency Contact Details and other required safety information as per requirements shall be prominently displayed at all critical locations. These displays shall preferably be made of sunboard or equivalent durable material.

GTP-16: Fire detection and alarm system

Sl. No.	Parameter	Requirement (As per Tender)	Bidder's Response
1	System Type	Intelligent / Addressable Fire Detection & Alarm System	
2	Fire Alarm Control Panel (FACP)	Microprocessor-based with LCD display, event logging & diagnostics	
3	Power Supply	Operated from existing DC supply of substation	
4	Coverage Area	Complete E-house including MV room, Battery room, Transformer room, Control room, Office, Cable trench etc.	
5	Detection Type	Multi-sensor smoke detectors / heat detectors as applicable	
6	Manual Call Points	Break-glass type at strategic locations	
7	Alarm Devices	Audio-visual alarms (hooter + flasher), indoor & outdoor suitable	
8	Zoning	Multi-zone / multi-area addressable system	
9	Detector Compliance	Spacing, mounting & audibility as per applicable standards	
10	Interfacing Capability	Potential-free contacts / communication interface for integration	
11	AC/Ventilation Interlock	Automatic shutdown on fire detection in affected zone	
12	Surveillance Integration	Alarm/status signal to central monitoring/surveillance system	
13	Manual Control	Reset & override facility at FACP	
14	Cabling Type	FRLS copper cables, fire-rated	
15	Cable Routing	Segregated from power/control cables in conduit/tray	
16	Installation	Proper identification, mechanical protection & neat routing	
17	CO_2 Fire Extinguishers	6.5 kg capacity, minimum 20 Nos.	
18	DCP Fire Extinguishers	9 kg capacity, minimum 20 Nos.	
19	Fire Extinguisher Standard	As per IS 2190 / CEA guidelines	
20	Approved Makes	Ceasefire / Kanex / Minimax	
21	Accessories	Nitrogen filling adaptor, mounting stands, spares	
22	Certification	Hydrotest & test certificates to be provided	

23	Standards Compliance	IS / NFPA / EN standards	
24	Testing & Commissioning	Complete functional testing including interlocks	
25	Documentation	As-built drawings, cause & effect matrix, manuals	
26	Training	Training for operation & maintenance personnel	
27	Safety Markings	Exit signs, evacuation plan display	
28	Photoluminescent Marking	Glow signage for emergency visibility	

TECHNICAL SPECIFICATION NO - A18 (ILLUMINATION SYSTEM)

1.0 **Scope of work**

1.1 Design, Supply, Install, testing & commissioning of the illumination system as per latest prevailing standards of India for the interior and exterior of E-house, Ring Road, Transformer Yard, Oil pit etc.

1.2 The lighting System design shall comply with acceptable norms and the best engineering practices. The lighting shall be designed to provide uniform illumination with minimum glare, meeting the maintained lux levels as specified elsewhere in this document and measured as per IS 3646. The lighting system shall meet all the statutory requirements, local rules etc.

1.3 Illumination shall be designed for the following specific areas considering the National Lighting Code (NLC) and IS 3646 or latest amendment as basis:

a) Control Room inside E-House
b) Office Rooms inside E-House
c) Corridors inside E-House
d) E-house cable cellar
e) Transformer Room- Indoor & Outdoor
f) Oil Pit, NGR area
g) battery Room
h) Electrical Switchgear Room
i) conference room
j) Exterior walkways
k) Ring Road illumination

1.4 Different Type of Lighting: Illumination system shall be designed to address the following conditions:

a) Lighting during Normal Operation: 230 VAC, 50 Hz

b) Lighting during Emergency Condition: Available DC power supply of E-House. Minimum back up of 3 hour is required.

1.5 Special attention shall be given to the illumination of the following areas:

a) Transformer Oil Pit area
b) battery Room
c) cable Trenches

2.0 **Mountings:**

a) All luminaries shall have mounting on the E-House walls. No pole is advisable for mounting of luminaries used for illumination of indoor and outdoor area adjacent to E-house.

b) Arrangement shall be made for proper mounting of luminaries for illumination of cable trench area underneath the E-house

c) Arrangement for mounting shall be made for proper illumination of outdoor transformer bay, NGR and Oil pit area. Use of pole for illuminating transformer yard is not advisable as it may restrict heavy vehicle movement.

3.0 **Junction Boxes and Accessories**

The junction boxes shall comply the following requirements:
a) The terminal blocks will be installed on asymmetric rails for the connection of the incoming, outgoing and derivation circuit;
b) the entrance of the cables shall be located in the bottom of the enclosures;
c) a ground bar shall be provided with screw type terminals;
d) suitable cable glands shall be provided for incoming and outgoing cables;
e) 240 V receptacle outlet shall be provided for lighting junction box; and
The interior design of the box, shall allow sufficient access to the rear terminal of all devices, for removal and repair if required.

All wiring within the panels shall be heat and flame retardant, rated 90°C maximum operating temperature and listed ANSI/NFPA 70 or approved equivalent, rated 600V/1000V with insulated tinned stranded annealed copper conductor, and shall not be smaller than 2.5 mm2.

All wiring shall be made without splices. The control wires shall be multi stranded flexible and shall be terminated with terminals.

Groups of terminal blocks shall be identified using engraved labels. Or alternatively terminal blocks markings shall be of ferrule type, permanently marked and shall be made of material that will not deform or deteriorate.
All AC and DC power circuits shall be protected by internally rail mounted MCB with auxiliary contact for control purposes (by others).

4.0 **Lighting junction boxes**

Each lighting fixture shall have a junction box and accessible compartment lockable with keys and shall be fully protected and sealed against ingress of water or vermin. Each derivation circuit shall be protected by the means of a fuse or a miniature circuit breaker of required current and voltage rating and short-circuit capability.

(a) Enclosure Protection - IP 55
(b) Material - Aluminium
(c) Minimum thickness mm 3
(d) Paint - Shade 631 of IS:5
(e) Door – Hinged
(f) Accessories Mounting plate, detachable – Yes
(g) Padlockable door with handle - Yes
(h) Door stopper in open position - Yes
(i) Power outlet - 240 Vac double
(j) Cable entrance plate
- Material Aluminium
- Location bottom
(k) Wiring accessories
- Plastic cable ducts Yes
- Asymmetric rails with terminal block Yes
(l) Space heater - Yes

(m) Lighting - Door activated
(n) Pocket for documentation - Yes
(o) Standards IEC 60947
(p) Quality control - ISO 9001
(q) Corrosion Protection- Yes

5.0 Outdoor Lighting Control Panels (Sub-lighting distribution board), 415VAC
Outdoor transformer yard shall be provided with specific lighting boards. The number of miniature circuit breakers for distribution feeders shall be as per the project requirements with 20% spare.

(a) Mode of control - Manual
(b) Controlled circuits - 2 circuits of 415/240 Vac
(c) Switching device - Contactor
(d) Switching capacity A 30
(e) Protection – Thermal magnetic
(f) Cabinet Protection class – IP65
(g) Standards IEC 60598
(h) Quality control - ISO 9001
(i) Installation - Outdoor

6.0 **Lighting Luminaries**

All LED luminaries shall comply with IS16101/16102 and IEC 60598.EMI/EMC compliance as per IEC 61000 series shall be mandatory for E-House installations.

Latest energy efficient lighting lumanries shall be used for illumination of the E-house, ring Road and Transformer yard. Attention shall be given that maintenance personnel have easy access to the fixtures both inside and outside of E-house without facing any safety hazard.

a) Luminaries shall consist of corrosion resistant hardware;
b) LEDs for interior lighting in E-House & Offices;
c) LEDs for exterior lighting. Outdoor LED must has be IP 65 or More.
d) Emergency lighting unit shall use available DC power source in substation.
e) Luminaries shall be watertight, and

6.0 **Power Socket, Wiring & Conduit**

a) Indoor Power Socket Point: 16 A socket point shall be made available near critical equipment inside E-house for maintenance.
b) Outdoor Power Point: Three phase power point shall be made available near outdoor power transformer for use of Oil Filtration machine as and when required.
c) Wiring Should be fire-retardant PVC in conduits.
d) The minimum size of conductor for lighting circuits shall not be less than 1.5 sq. mm copper.
e) The minimum size of conductors for socket outlet circuits shall not be less than 2.5 sq. mm copper. All the lighting cables shall be finalized during design phase
d) AC & DC wiring must not run through the same conduit.

TECHNICAL SPECIFICATION NO - A19 (Air conditioning System)

A) Scope of Work:

The scope of this tender includes the bidder/vendor to do the heat load calculation of the entire package and design air conditioning systems of wall mounted controlled from a dedicated panel within the enclosure to maintain average temperature of 25°C or any specified by OIL INDIA.

B) General Guidelines:

I. Bidder/vendor shall strictly adhere to the latest circular from ministry of power and Bureau of Energy Efficiency (BEE) shall be considered while selecting the AC units.

II. Air conditioning system shall be designed considering maximum outdoor ambient temperature, relative humidity, solar heat gain, and internal heat dissipation based on site conditions of OIL INDIA installation location.

III. AC system shall be designed with minimum N+2 redundancy for critical rooms such as control room, switchgear room, and battery room, to ensure continuous operation during failure or maintenance.

IV. Air conditioning system shall be suitable for continuous 24×7 operation under full load conditions

V. AC units and control panels shall be suitable for operation on 230 V, 1-phase, 50 Hz supply as available at site. Necessary MCB/MCCB, overload, short-circuit, and phase protection shall be included in the scope of vendor.

VI. All indoor units, piping, and ducts (if any) shall be anti-corrosive and suitable for high humidity and industrial environment.

VII. Refrigerant piping shall be properly insulated to avoid sweating and condensation.

VIII. Supporting heat load calculations shall be furnished by the bidder to determine size and quantity of split A/c units.

IX. The air-conditioned cooling design shall include moisture – proofing and thermal insulation to prevent occurrence of internal condensation.

X. AC system shall be interlocked with smoke detection system to shut down on alarm.

XI. Temperature sensors shall be provided for monitoring the temperature inside the container.

XII. Air conditioner shall be supplied with control panel which shall do automatic changeover of standby AC in every eight hours. Air Conditioning/ventilation system Exhaust fans shall be provided for separate battery room.

XIII. Air conditioning system shall be covered by minimum 12 months warranty from commissioning.

XIV. The control panel shall have the following features:

1) Auto/manual operation
2) Fault annunciation
3) Indication of running/standby units
4) Temperature display
5) Auto changeover logic

Control panel shall be suitable for mounting inside the E-house.

XV. Air conditioning units shall be considered for the following locations of the E-house:

E-house #1:
i) 33 kV, 11 kV, LT switchgear room
ii) Battery Room
iii)Conference Hall

E-house#2:
i) Control room
ii) Room No-1, 2 & 3

XVI. Drawing: Wiring diagram of the entire air conditioning scheme shall be supplied along with the product delivery.

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TECHNICAL SPECIFICATION NO – A20
CCTV

1.0 SCOPE OF WORK

The scope includes design, engineering, supply, installation, testing, commissioning and handing over of a comprehensive IP-based CCTV surveillance system for the new 33/11 kV E-House substation. This shall also include all necessary hardware, software, accessories, cabling, and mounting arrangements.

2.0 The system shall cover:

(i) 33KV, 11KV, 415 V Switchgear Room.
(ii) Control Room
(iii) Station Transformer Room
(iv) Battery Room
(v) UPS & Battery Charger Room
(vi) Outdoor Transformer, NGR, APFC
(vii) Job Allocation Room
(viii) Conference Room
(ix) Substation periphery and entry/exit.

3.0 The CCTV system should be based entirely on Internet Protocol (IP) technology, utilizing network cameras connected through industrial-grade Ethernet infrastructure. The design shall ensure high reliability, redundancy, and future expandability. All cameras shall communicate over a structured network using managed switches, and the video data shall be transmitted to centralized Network Video Recorders (NVRs) installed within the E-House.

4.0 The architecture should be designed in such a manner that it supports seamless integration with the proposed 20 IP cameras of similar specification as mentioned in this tender to be installed in GTG and GEG plants. A unified Video Management System (VMS) platform should be deployed to allow viewing of all cameras, both new and proposed, on a single interface without any compatibility issues. All equipment shall comply with ONVIF standards to ensure interoperability.

5.0 The system shall be designed with adequate margins to support future expansion, allowing the addition of at least fifty percent more cameras without requiring major infrastructure changes.

6.0 The surveillance system should provide centralized monitoring, recording, and management, with live video feeds simultaneously available in both the Engineer Room and the Control Room of the E-House.

7.0 The CCTV cameras shall be installed as per the attached CCTV layout, wherein camera locations are tentative. The Contractor shall ensure that each location is covered with an appropriate type of camera suitable for the specific application and environmental conditions.

8.0 Outdoor areas such as transformer zones, Neutral Grounding Resistor (NGR) locations, and APFC panels shall be monitored using high-resolution (min 4/5MP fixed Bullet Camera), weatherproof cameras with adequate zoom capability and infrared illumination for night visibility. Cameras installed along the substation perimeter shall provide continuous surveillance with long-range night vision and intelligent video analytics such as motion detection and intrusion alerts.

9.0 Indoor areas including 33KV panels, 11KV panels, LT panels, UPS and battery charger room, station transformer room, battery bank room, control room, conference room, and job allocation room shall be covered using fixed dome cameras (Min 4MP) with wide-angle lenses and infrared illumination for night visibility.

10.0 All cameras shall be of high-definition quality, supporting efficient video compression (H.265 or better), wide dynamic range, and network-based configuration.

11.0 The system should include centralized Network Video Recorders (NVRs), and 64 Channel capable of recording video streams from all cameras installed continuously. The storage system shall be sized to retain video recordings for a minimum period of thirty (30) days for all cameras at full resolution and frame rate.

12.0 The CCTV system should provide real-time monitoring facilities at two distinct locations within the E-House. The primary monitoring station shall be located in the Engineer Room, where a workstation equipped with multiple large-size LED monitors (min 55inch) shall be installed. This station should function as the central control point for live viewing, playback, and system management through the Video Management Software.

13.0 A secondary monitoring arrangement shall be provided in the Control Room, enabling operators to view live feeds and access playback as required. The system shall support simultaneous viewing from both locations without degradation in performance. The display system shall be capable of showing multiple camera feeds in various split-screen formats.

14.0 The complete CCTV system, including cameras, network equipment, and recording systems, shall be powered from the existing substation UPS system. No separate UPS shall be provided under this scope. The Contractor shall ensure proper load calculation and distribution to maintain uninterrupted operation during power outages.

15.0 All equipment shall be provided with adequate surge protection, proper grounding, and compliance with electrical safety standards applicable to substation environments.

16.0 All network cabling shall be carried out using industrial-grade CAT6 or higher specification cables. Outdoor cables should be UV-resistant and suitably protected against mechanical damage. Proper routing through cable trays, conduits, or

trenches shall be ensured.

17.0 The installation should include proper mounting structures for cameras, ensuring stability and optimal field of view. All installation work shall adhere to best engineering practices and safety standards.

18.0 A centralized Video Management Software (VMS) platform should be provided for system operation. The software should support live monitoring, playback, recording management, alarm handling, and user access control. The system shall allow multiple users with different access levels and shall support integration with existing surveillance infrastructure.

19.0 The Contractor shall provide complete documentation including layout drawings, network diagrams, configuration details, and operation manuals. Training shall be provided to the Owner's personnel for effective system operation and maintenance.

TECHNICAL SPECIFICATIONS OF IMPORTANT MATERIAL TO BE SUPPLIED:

l. No.	Parameter	Specification
55" LED Monitor		
2.1	Monitor	Min 55 Inch
2.2	Display Resolution	4K
2.3	Backlight Module	Dynamic Edge LED
2.4	MPEG Noise Reduction	Yes
2.5	Viewing Angle	178x178
2.6	Response Time	8 ms
2.7	Power Supply	100 V to 240 VAC, 50 Hz +/- 5%
2.8	Remote Control	Infra-Red Remote with Control Function
2.9	Mounting	Bidder required to provide Movable /Adjustable wall Bracket to mount TV on wall at Security, Control Room & In-charge Room. The Bracket require to be movable so that TV view can be adjusted.
2.10	Preferred Makes	Samsung / LG / Sony / Panasonic
2.11	Make & Model	Bidder has to clearly mention the Make & model of the offered monitor.

Sl. No.	Parameter	Specification
64 Channel NVR with 8 HDD		
1.1	IP Video Input	64 Channels
1.2	Storage	8 SATA hard drives each support up to minimum 6 TB per slot
1.3	Bandwidth	Incoming & Outgoing bandwidth: min 320 Mbps Incoming & 320 Mbps outgoing throughput
1 .4	Video Compression	H.264, H.265, H.265+
1.5	Video Output	Min 1ch HDMI, 1ch VGA
1.6	Live view/Playback resolution	Up to 8MP
1.7	Recording Resolution	Up to 8MP
1.8	Network Interface	1 RJ-45 Port (10/100/10000 Mbps)
1.9	USB interface	2 × USB 2.0; 1 × USB 3.0 or better
1.10	Certification	CE, FCC, UL, BIS
1.11	Operating Temperature	0°C - 55°C
1.12	Operating Humidity	10% - 90% (non- condensing)
1.13	Supported Protocols	Supports TCP/IP, IPv4, DHCP, DNS, RTSP, NTP, DDNS, PPPOE, FTP, UPNP
1.14	ONVIF	Should support ONVIF profile S or higher
1.15	Alarm I/O	16-ch input, 4-ch output
1.16	Make & Model	Bidder has to clearly mention Make & Model of the offered NVR

Sl. No.	Parameter	Specification
4 MP Dome Camera		
3.1	Camera Type	4MP Dome Camera, IP, Color, Outdoor, Weatherproof, POE Enabled
3.2	Lens Focal Length	2.8 - 12 mm
3.3	Image Sensor	1/2.7" Progressive Scan CMOS or better
3.4	Resolution	4 MP (2560 x 1440) at 25 FPS or better
3.5	Day & Night Operation	True Day or Night with IR Cut Filter
3.6	Illumination	Color mode: 0.003 Lux;0 Lux with IR
3.7	Shutter Time	1/3 s–1/100000 s or better
3.8	IR	Min 30 m
3.9	Signal to Noise Ratio	50 dB or better

3.10	WDR	120 dB or better
3.11	Video Compression	H.265, H.264 & M-JPEG. The camera OEM should be an official HEVC license for using the genuine legal H.265 compression. Documentary proof to be submitted in this regard.
3.12	Video Streaming	Min. three compressed stream
3.13	Video Analytics	Motion Detection & Camera Tampering
3.14	Onboard Storage	Min. 128 GB
3.15	Audio	1 input 1 output
3.16	Audio Compression	G.711-U/G.711- A/AAC
3.17	Alarm In/Out	Minimum 1 input, Minimum 1 output
3.18	Ethernet	10Base-T / 100Base-TX, RJ45 connector
3.19	Standard	ONVIF Profile S, G and T Compliant (ONVIF approved certificate / ONVIF conformant devices listed on the ONVIF global website). Along with the bid, the bidder shall submit a declaration from OEM in this regard.
3.20	Network Protocols	IPv4/IPv6, TCP/IP, ICMP, IGMP, DHCP, SMTP, NTP, RTP, RTSPS, HTTP, HTTPS, SSL, TLS, DNS, IP Filter, Unicast, Multicast
3.21	Ingress Protection	IP66 or better
3.22	Impact Resistance	IK10 (Vandal Proof)
3.23	Cyber Security Compliance	Multiple user access levels should be available with enhanced password policy, Data Security Standard compliance, Digest authentication, IP Filtering, AES 256-bit Encryption. The cameras offered must have certification from STQC regarding compliance of Essential Requirements (ERs) for security of CCTVs as per guidelines of MeitY. Along with the bid, the Bidder to submit documentary evidence in this regard.
3.24	Certification	BIS:13252, STQC as per MeitY Guideline on ER (Essential Requirements)
3.25	Operating Temperature	7°C ~ 60°C Humidity 95% or less (non- condensing)
3.26	Power Supply	Bidder to supply suitable power adapter considering input power of 230 VAC @ 50 Hz power supply.
3.27	Surge/Lightening Protection	Required (Internal/External) Industrial Grade.
3.28	Mounting Accessories	Required to mount the camera on wall/pole. Suitable sun- shroud/ canopies shall be provided with camera.
3.29	Make & Model	Bidder has to clearly mention Make & Model of the offered camera.

Sl. No.	Parameter	Specification
4. 4MP/5MP Fixed Bullet Camera		
4.1	Camera Type	4MP / 5MP Fixed Bullet Camera, IP, Color, Outdoor, Weatherproof, POE Enabled
4.2	Lens Focal Length	Motorized Varifocal Lens 3.6 or better
4.3	Image Sensor	1/2.8" or 1/3" Progressive Scan CMOS or better
4.4	Resolution	4 MP (2560 x 1440) / 5 MP (2560 x 1920) at 25 FPS or better
4.5	Day & Night Operation	True Day or Night with IR Cut Filter
4.6	Illumination	Color mode: Min. 0.005 Lux; 0 Lux with IR
4.7	IR Distance	50 m (Internal /External)
4.8	Signal to Noise Ratio	50 dB or better
4.9	WDR	120 dB or better
4.10	Video Compression	H.265, H.264 & M-JPEG. The camera OEM should be an official HEVC licensee for using the genuine legal H.265 compression. Documentary proof to be submitted in this regard.
4.11	Video Streaming	Min. Three compressed streams
4.12	Video Analytics	Motion Detection & Camera Tampering
4.13	Onboard Storage	Min. 128 GB
4.14	Audio	1 input 1 output
4.15	Audio Compression	G.711-U/G.711-A/AAC
4.16	Alarm in/out	Minimum 1 input, Minimum 1 output
4.17	Ethernet Communication	10Base-T / 100Base-TX, RJ45 connector
4.18	Standard	ONVIF Profile S, G and T Compliant (ONVIF approved certificate / ONVIF conformant devices listed on the ONVIF global website). Along with the bid, the bidder shall submit a declaration from OEM in this regard.
4.19	Network Protocols	IPv4/IPv6, TCP/IP, ICMP, IGMP, DHCP, SNMP, SFTP, NTP, RTP, RTSP, HTTP, HTTPS, SSL, TLS1.2, 802.1x, QoS, PPPoE, DNS, DDNS, UPnP, IP Filter, Multicast
4.20	Ingress Protection	IP 67 or better
4.21	Impact Resistance	IK10 (Vandal Proof)

4.22	Cyber Security Compliance	Multiple user access levels should be available with enhanced password policy, Data Security Standard compliance, Digest authentication, IP Filtering, AES 256-bit Encryption, IEEE 802.1x. The cameras offered must have certification from STQC regarding compliance of Essential Requirements (ERs) for security of CCTVs as per guidelines of MeitY. Along with the bid, the Bidder to submit documentary evidence in this regard.
4.23	Certification	BIS:13252, STQC as per MeitY Guideline on ER (Essential Requirements)
4.24	Operating Temperature	0°C ~ 60°C, Humidity 95% or above (non-condensing)
4.25	Power Supply	Bidder to supply suitable power adapter considering input power of 230 VAC 50 Hz power supply.
4.26	Surge/Lightening Protection	Required (Internal/External) Industrial Grade.
4.27	Mounting Accessories	Required to mount the camera on wall/pole. Suitable sun-shroud/ canopies shall be provided with camera.
4.28	Make & Model	Bidder must clearly mention Make & Model of the offered camera.

Sl. No.	Parameter	Specification
5. 6 TB / 10 TB HDD		
5.1	Formatted Capacity	6 TB / 10 TB
5.2	Interface	SATA 6 Gb/s
5.3	Cache	256 MB
5.4	Transfer Rate	180 MB/s
5.5	Preferred Makes	Seagate / Toshiba / WD
5.6	Make & Model	Bidder has to clearly mention Make & model of the offered HDD.

A) General Technical Specifications and Requirements:

A.1 The CCTVs in each location are to be established in Ring Topology. (Typical

schematic drawing is attached as **A20.1**.

A.2 System shall have provision of WAN connectivity for remote monitoring/ viewing.

A.3 System shall have synchronization of Server time with NTP Clock.

A.4 All CCTV cameras should be ONVIF compliant to maintain the open/heterogeneous environment.

A.5 MAC IDs of the CCTV Cameras shall be registered in the name of the OEM.

A.6 The offered Storage system shall provide sufficient storage for a minimum period of 30 days @ Full Resolution and the highest video quality of camera @ 25/30 FPS or better for all the cameras in each location using necessary compression technique. The video shall be compressed using H.265 or better compression technique and stream over the IP network.

A.7 OIL shall provide a 230 V AC + 10%, 50 Hz single-phase power supply. The CCTV system shall operate on 230 V AC + 10%, 50Hz single-phase power supply. If any equipment operates on any voltage other than the supply voltage and supply frequency, necessary conversion/correction device for supply shall be supplied along with the equipment and shall be in vendor's scope.

A.8 Cable gland for the Junction Boxes shall be double compression type made of SS-316 as minimum.

TECHNICAL SPECIFICATION NO – A21 (E-House)

1) SCOPE OF WORK:

A) The scope of this tender shall cover design, engineering, manufacture, supply, assembly, integration, testing, transportation, erection, installation, commissioning support, and documentation of two (02) prefabricated E-Houses, complete in all respects, as described herein. The entire responsibility and performance guarantee shall rest with the Vendor/Bidder.

B) The Vendor/Bidder shall be fully responsible for delivering a ready-to-operate, weatherproof, electrically safe, structurally sound, and fully integrated E-House system, including all internal systems, interfaces, and accessories necessary for intended operation, even if not explicitly mentioned but required for completeness. No scope shall be considered excluded based on omission unless explicitly stated in the tender document.

C) The Vendor/Bidder shall design the E-house as per the site condition of Moran. Expected design life shall be 25 years.

2) GENERAL GUIDELINE OF E-HOUSE:

The project envisaged the requirement of two (02) separate E-houses. The E-houses are to be named as E-house:1 (Electrical switchgear room) & E-House:2 (Control room) for ease of communication. Please refer drawing **A21.1** for general arrangement of the E-house. Following equipment are proposed to be installed inside the E-houses:

A) E-House:1 (Electrical Switchgear Room):

1. 33 kV Switchgear (AIS) & 11 kV Switch gear (AIS) with Protection Relays & Local Control arrangement
2. LT switchgear
3. 2 no. 500kVA dry type auxiliary transformer (Inside E house)
4. Battery (110V VRLA maintenance free), Battery Charger, UPS etc.
5. Job allocation/Conference room-1 No
6. Rooftop Solar PV panels
7. LV AC & DC Distribution system
8. Earthing for enclosure and Electronic earthing for panel
9. Lightning protection
10. SCADA/Internet/CCTV/Fire alarm cabinets
11. Inter panel and equipment cabling between all supplied items
12. Lightings with occupancy sensor and Receptacles,
13. DC/AC Emergency lighting system.
14. AC control panel. Split AC system with dehumidifier to suit equipment and

ambient heat loads

15. Fire detection & fire-fighting system , Fire Extinguisher
16. Platform surrounding E-house with railing
17. Railing in E-House roof for safety of personnel carrying out installation & maintenance of solar roof top
18. First Aid box
19. Provision to Hang, paste Electric Shock treatment Chart, SLD, SOP, Emergency Contact nos. etc.
20. Trolley for rack in/rack out of VCB, if any
21. Provision to keep OIL telephone
22. Other accessories as per project requirements

B) E-House:2 (Control Room)

1. New Control room for control and monitoring
2. Synchronizing panel
3. Wall Mounted Screen to monitor real time power system data in mimic diagram (SAS)
4. HMI-Energy Monitoring System
5. HMI-CCTV
6. HMI- Asset Monitoring/Condition Monitoring Screen,
7. First Aid box
8. Provision to keep OIL telephone
9. Provision to Hang, paste Electric Shock treatment Chart, SLD, SOP, Emergency Contact nos. etc.
10. Fire extinguisher
11. Cabinet to keep OIL's intranet module, CCTV NVR etc.
12. Provision for placing biometric system
13. Officer's Room-2
14. Supervisor room-1
15. Common room – 1
16. Table for keeping PCs, Telephone etc. in control room
17. File Rack in control room
18. Key holder
19. Other accessories as per project requirements

C) E-house:1 shall be designed to have a clearance of minimum 2 M above the finished ground level. The available space beneath the E-House-1 to be utilised as cable trench for routing MV, LV power, control, signal cable etc. The space shall be isolated with fencing to prevent unauthorised entry. Lighting in the cable trench shall be designed to ensure sufficient illumination. Danger boards as per latest standard shall be used in the fencing.

D) E-House:2 shall be designed to maintain the continuity of the the existing control room of 3 MW GEG building. Design shall be such that shift operating personnel can move easily as per requirement between the two control rooms without any hindrance or safety hazards.

The clearance of the E-houe:2 from the ground shall be such that it matches with

the control room of the 3 MW GEG plant.

The connecting corridor between the two-control room shall be weatherproof and necessary precautions to be opted to prevent water leak propagating from the walls of the 3 MW GEG.

E) Job allocation room shall be a separately fire-rated, acoustically isolated room, not opening directly into switchgear hall.

F) Battery, Transformer & Switchgear shall be installed separate room having 2-Hr fire rated insulation for prevention of propagation of fire.

G) Battery room shall be equipped with air conditioner, ventilation and hydrogen detection system.

H) Corridor shall be provided between E-house:1 and E-house:2 for easy movement of the operating personnel. Special precaution shall be taken avoid rainfall or water seepage in the walkway.

I) Solar PV system of adequate size as per the available rooftop of E-House shall be installed to harness the solar power for electricity generation. The integration of the Solar PV system, synchronization with the electrical system of E-house shall be under the scope of vendor/Bidder/System Integrator. Solar PV system shall be integrated with EMS, SAS & condition monitoring system.

J) Provision shall be available in the E-house for systematic drainage of rainwater.

K) Provision for earthing of both E-houses shall be as per as per IS-3043.

L) The foundation of the E-house shall be designed & constructed by the bidder/vendor/system integrator. The design scheme shall have to be approved by OIL before commencement of the work. Necessary information as requested by OIL shall be made available.

M) Considering safety, design shall include platforms surrounding the E-houses, staircase, handrail in the platform as well as roof top having solar PV system, monkey ladder etc.

N) E-house interior shall be designed such that House –keeping can be carried out by OIL's personnel at a regular interval. Any special precaution shall be categorically mentioned.

O) Anti-skid flooring shall be ensured for safety of the personnel.

3) SPECIFICATION OF THE E-HOUSE:

I) E House shall be designed to withstand the external environmental conditions, seismic condition, Wind load, earthquake, imposed load condition and dynamic loads associated with transport as per Relevant IS. Supporting calculation for above to be submitted during detail engineering.

II) The prefabricated enclosure(s) frame shall be constructed as a rigid, self-supporting steel structure. Enclosure base frame shall be Hot Dip Galvanized / Zinc Spray Metallization made of ISMC base channel. Four corners of the base frame to be suitably welded to ensure rigidity to absorb shock and vibration during transportation and lifting.

III) The switchboard and control equipment housings which shall be located within on-board protected enclosures such as switch rooms and operator's cabins shall be manufactured to IP 55 design. Bidders need to ensure that E-House container will be designed for IP 55. Bidders need to demonstrate actual testing on the product for water numeral i.e. IP X5 and required test results will be provided. Further the Dust numeral to be proven by Design. Bidder to demonstrate the following tests at assembly location to confirm the product suitability to IP 55 as below

A. Water Ingress Test in Black Condition and prior to insulation to check Water Ingress on the Complete Container weld joints.
B. During Final inspection, water leak test to be performed for Doors, Cutouts and external attachments.
C. Air leak test at doors to check possible Dust Ingress by Paper Flutter Test.
D. The Air leak test to be performed only on Doors to avoid any possibility dust ingress through same.

IV) Main Shell: The main fabrication of the structural framework should be of integral and all welded type to comprise of the bottom frame, overall framework, internal and external cladding with insulation and other peripherals, sloping self-draining roof and desired door-window, A/C opening etc. The main corner vertical support posts should be formed into a press component from minimum 5mm thick MS tested quality plates as per IS specifications and all the corner posts should be suitably welded at the top with a heavy gauge MS plate which should be able to hold steel forged lifting hooks or corner casting arrangement with minimum 50 mm holes.

V) Base Frame: The main bottom (Base) frame should be fabricated and welded out of tested quality MS pressed steel channel sections and all the interconnecting cross members should also be steel channels duly welded lengthwise & breadthwise and conveniently equally spaced and covered with MS sheet continuously welded to the bottom frame & a gooseneck tunnel, welded together as a subassembly. The base frame should have sufficient strength to withstand the overall load comes from the cabin.

VI) Skid: Under the base frame of cabin is to be mounted on a skid consisting of Indian Standard Medium Beam – ISMB. For placement of cabin, base frame and skid should be made in such a way that, RCC/Steel foundation supporting the cabin can be well connected through nut & bolt system or welding.

VII) The roof framing and the columns shall be designed to support any additional dead load suspended from the roof such as Solar PV panels along with accessories over the roof, air conditioning duct, false ceiling, cable trays, light fixtures etc.

VIII) The prefabricated enclosure(s) shall be designed to withstand loading induced by land transportation, installation and operation. Lift analysis and design shall be in accordance with latest revision of IBC. Building shall be designed to limit lift and operating base deflection to L/240.

IX) Bidder shall ensure that with above ambient condition, the performance of any equipment installed inside pre-fabricated enclosure is not affected. All performance parameters of equipment should remain within specified limit.

X) It shall be the bidder's responsibility to coordinate all necessary alignment and interconnection between component sections. The entire assembly must be electrically and mechanically assembled into one single line up prior to final inspection and shipment.

XI) The floor framing shall be fabricated from ASTM A36 / JIS 3101 or equivalent steel members to form a rigid rectangular frame. The frame shall be braced with cross members as required to support the equipment installed in the E-house.

XII) Base frame of the enclosure to be designed along with lifting hooks/arrangement capable of lifting the fully equipped structure at the specific lifting points with no distortion of any equipment inside E House.

XIII) Supporting Structure shall be manufactured using HRCA / CRCA square tubes / channels of suitable thickness.

XIV) All exterior walls shall be air and watertight and shall be capable of maintaining this tightness during and after any transport or lifting operations.

XV) The shell of the E- house (container) shall be all of weld construction.

XVI) All the external welding shall be continuous, uniform and full penetration.

XVII) Door: A minimum of two doors shall be provided unless otherwise specified. One equipment door and one personnel/emergency exit door shall be provided. There shall be adequate space on both side of the equipment door for moving in/out largest shipping section of equipment. All doors should have weatherproof construction with possibility of frames in design.

The size of door shall be as per equipment sizing. One personnel door minimum 1.2M x 2.5Mshall be provided. Personnel doors shall be double glaze (Fireproof) for effectively sealing against water ingress in closed condition by using proper gasket profiles. Above doors, reconditions are to be provided over in areas like E-House joint parts to avoid water leaking into Joints. The container house shall be guaranteed for a minimum of ten years (10 years) against any type of leakages. The door panels shall be made of 2mm thick CRCA and Rockwool insulation for thermal protection. The door structure shall be rigid enough to withstand handling rigorous transportation hazards, flexing/distortion. 500 mm external sun/rain canopy shall be provided at Door/Openings to prevent seepage of water when the door is open. Exterior door Hinges shall be concealed type and made of Stainless steel.

XVIII) Attentions are to be paid to prevent any corrosion of metal parts.

XIX) Structure walls and roofs shall be formed by means of 2 mm thick CRCA sheet with thermal insulating material inside. The exterior walls and frames around door and any other opening if any shall be structurally adequate to sustain all applicable loads.

XX) Roof slopes shall be designed in a way to maximize electricity production from solar PV plant without disturbing the rainwater pathway. Roof edges/ slopes

shall be provided with drain arrangements for water draining from top and collecting the same for rainwater harvesting or internal use. Roof shall be welded with the main structure to form an integrated assembled section. Roof outer wall shall be made of 2mm thick CRCA with Thermal Insulating material inside. Roof inner wall thickness shall be 1.2mm thick manufactured of CRCA sheet. Roof framing shall be designed to support any additional dead load suspended from the roof such as false ceiling, cable trays, light [Text Wrapping Break] fixtures, piping (If any). Roof can be splatted in 2~3 sections depending upon design and handling at site. Roof shall be fixed type welded with the support structure.

XXI) Flooring System: Floor shall be plain steel plate minimum 5 mm thickness with anti-static vinyl flooring / epoxy non-skid coating. Floor plate should be painted on both sides. Exposed Floor plate seams & edges shall be bolted to ensure a continuous floor. High grade PVC insulation mat as per relevant IS code and CEA guidelines shall be provided to cover entire flooring of the E-House. Insulation mat shall be rated for highest system voltage in the E-House.Floor plating shall be covered with a non-skid surface. High grade PVC insulation mat shall be provided to cover entire flooring of the E-House. Insulation mat shall be rated for highest system voltage in the E-House.

XXII) Exterior walkway, stairs with handrails and landing shall be provided.

XXIII) External paint finish shall provide an expected life to meet minimal maintenance in site condition.

XXIV) All the wall & roof materials used shall be non-combustible type.

XXV) E-Houses will be insulated on sides, end walls, partitions, roof & doors with minimum 50 mm thick Glass Wool/Rockwool insulation. The insulation material will have a density of minimum 100kg/ m^3 and insulation shall follow IS:8183.2 Hours Fire Rated Thermal insulation should be provided. The quality of the insulation material shall be ensured so that no issues develops within ten (10) years of supply.

XXVI) Interiors of the E-Houses shall be aesthetically finished as to give a pleasing appearance with high quality workmanship. All joints shall be neatly finished. For side and end walls panelling will be done with 1.2 mm thick CRCA sheet.

XXVII) Equipment support: Equipment support frame should be welded to the floor plate for installing floor mounted equipment.'

XXVIII) Rain gutter: Rain gutter with rain down pipe should be provided for proper drainage of rainwater from the roof.

XXIX) Paint : To suit extremely corrosive/Humid atmosphere.All steel structure members shall be cleaned prior to finishing. Standard interior finish shall be white.

XXX) E-house vendor have to provide all civil and structural details as required during detailed engineering. Maintenance guidelines, spares if any, OEM details to be furnished during supply of E-house.

XXXI) Non-flammable material shall be used. All operating instruction, fire exit route, Electrical Danger etc. shall also be marked. Emergency Exit route shall be marked with radium colour. All equipment's including junction boxes, safety switches, switchgears, circuit breakers, control devices, communication equipment, marshalling panel etc. shall be labelled.

XXXII) The electrical distribution panel can be wall mounted type and shall have feeders for lighting circuits, sockets, air conditioning units, F&A panels, spare

etc. The incoming supply for this panel shall be from LT panel installed inside E-House and will have a main TPN MCB of sufficient rating depending upon the load inside E-house. The feeders shall be through 2 pole MCBs for single phase circuits and 4P MCBs for 3 phase circuits. The feeders shall be arranged such that the load shall be balanced among three phases. The enclosure shall be of minimum IP41 rating, powder coated paint. The wiring circuit of the E House for lighting will include a suitable 1-phase power input socket, distribution board with MCB for the light connections and other additional points as required.

XXXIII) Sufficient quantity 240 V, 1 Ph and 3 Ph, 5 A and 15A socket outlet shall be provided inside the E-House.

XXXIV) Electrical wiring has to be done as per respective IS standard with proper earthing system. All wires used for lighting system should be FRLS 1100V grade.

XXXV) Lux level shall be 300 lumen inside the E-house and outside platforms/ stairs shall be 100 lumen. Suitable luminaries (LED only) shall be selected with sufficient wattage to cater the required Lux requirement.

XXXVI) The enclosure shall be furnished complete with factory installed of emergency lighting and with EXIT light fixtures at each access doors. Thirty percent of total lighting fixtures shall be emergency lighting with UPS/Battery backup. The lighting system shall provide immediate emergency light (for at least 3 Hour) upon failure of the normal power source and shall switch off automatically when power is restored.

XXXVII) Grounding: (should follow IEEE- 80, IS 3043 and relevant standard)

XXXVIII) Internal Earthing inside enclosure and electronic earthing for panels with suitable cross sectional GI flats.

XXXIX) The E-House shall be furnished complete with ground pads which shall bond electrical equipment enclosure frames and ground buses to the E-House frame at the exterior base in two locations and at opposite ends of the e House to provide a continuous path to ground.

A) The Grounding system shall connect to each end of the ground bus in each assembly of installed equipment.

B) Provision to be provided for facilitating external / main grid earthing system.

C) Lightning Protection: E-House enclosure with all equipment shall be protected from lightning following IEC 62305 and relevant standard.

4) Inspection: Bidder/Vendor shall offer the E-houses for inspection to Official of OIL. The intimation shall be given minimum15 days prior to inspection. Dispatch clearance will be issued by OIL's representative only after satisfactory inspection. Factory acceptance tests (FAT) of major equipment shall be carried out at OEM's factory. However, the integrated FAT of E-house shall be conducted at assemble location and shall be dispatched as Plug & play solution to project site after approval from OIL's representative. After erection of all equipment in E-House iFAT shall be carried out as per agreed QAP. All equipment operations and functional checking including interlock and inter trip shall be shown during iFAT.

Bidder to demonstrate following test mandatorily during iFAT

A. Water Ingress Protection.
B. Dust Ingress Protection.

C. Paint Thickness Check.
D. Quality of welding through NDT. (Non-Destructive Test)

5) **DRAWING DOCUMENTATION:** Bidder/Vendor shall submit the following document:

1) For approval before commencement of manufacturing:
A) General Arrangement Diagram:
i) Overall E-house GA
ii) Equipment layout GA
C) Foundation & Civil interface Drawing:
i) Foundation GA & loading plan
ii) E-house elevation & section view
D) Structural drawing:
i) Base Frane & Lifting arrangement
ii) Structural framing Drawing
iii) Structural Design Calculation
E) wall, Roof & separation drawing
F) Fire Compartmentation Drawing
G) Door & Window Schedule
H) Flooring & Trench Drawing
I) BOM list

6) DELIVERY OF PRODUCT:

The Bidder shall be responsible for checking the shipping dimensions of the equipment to assure that they are within the available clearances of roads through which the equipment must pass. Each item shall be suitably packed and/or crated for shipment. Equipment shall be provided with supports of sufficient strength to permit hoisting with safety. The location of lifting points shall be clearly shown on Vendor's drawing. Lashing for all equipment to be provided in order to ensure safety of equipment during transportation. Following certificate and tools shall also be provided along with shipment

A) Tools & spares required for installation & commissioning at site
B) Warranty Certificate
C) Customer Service support details
D) Any other relevant document

7) MAINTENANCE PLAN:

A comprehensive maintenance plan of E House shall be furnished by bidder during detail engineering. Requirement of repainting, replacement of gasket, rubber and sealant items etc shall be mentioned in maintenance plan.

8) EMERGENCY EVACUATION PLAN:

A comprehensive evacuation plan of E House shall be furnished by bidder during detail engineering.

9) SAFETY EQUIPMENT & TOOL BOX:

I) Safety charts Danger boards as per IE rules shall be provided.

II) Entrance, exit and emergency exit sign, first aid box, and no smoking board to be provided.
III) Portable Fire Extinguishers shall be provided with necessary installation brackets near each entrance and in the middle sections.
IV) Fire bucket with sand -6Nos
V) 33 kV Gloves, goggles and discharge rod etc shall be considered in scope.
VI) Laminated overall SLD at suitable place on the wall of the Ehouse.
VII) Toolbox with minimum tools for O&M shall be provided.

GTP-17: E-House

Sl.No.	Description	Requirement (Tender Specification)	Bidder's Response
1.0	Scope of Work	Complete design, engineering, manufacture, supply, erection, testing & commissioning of 2 E-Houses	
1.1	Responsibility	Vendor responsible for complete, ready-to-operate system	
1.2	Design Life	Minimum 25 years	
2.1	Number of E-Houses	Two (E-House-1 & E-House-2)	
2.2	E-House-1	Electrical Switchgear Room	
2.3	E-House-2	Control Room	
2.4	Corridor	Weatherproof connection between buildings	
3.1	Structure Type	Welded, self-supporting steel structure	
3.2	Base Frame	ISMC channel, HDG / metallized	
3.3	Skid	ISMB beam structure	
3.4	Lifting Arrangement	Suitable for full load lifting	
3.5	Transport Load Design	Designed for transport & lifting stresses	
4.1	Degree of Protection	IP55 for complete enclosure	
4.2	Water Ingress Test	IP X5 test required	
4.3	Dust Protection	Air leak / paper flutter test	
4.4	External Welding	Continuous, full penetration	
5.1	Outer Wall Thickness	2 mm CRCA	
5.2	Inner Wall Thickness	1.2 mm CRCA	
5.3	Insulation Material	Rockwool / Glass wool	
5.4	Insulation Thickness	Minimum 50 mm	
5.5	Insulation Density	≥100 kg/m³	
5.6	Fire Rating	Minimum 2-hour fire resistance	
5.7	Roof Design	Sloped, self-draining	
6.1	Base Flooring	5 mm steel plate	
6.2	Surface Finish	Anti-skid epoxy / vinyl	

6.3	Insulation Mat	PVC mat for full area	
7.1	Number of Doors	Minimum two	
7.2	Personnel Door Size	1.2 m × 2.5 m minimum	
7.3	Door Construction	Insulated, weatherproof	
7.4	Canopy	500 mm rain canopy	
8.1	Lighting	LED lighting	
8.2	Lux Level (Inside)	300 lux	
8.3	Lux Level (Outside)	100 lux	
8.4	Emergency Lighting	30% fixtures, 3-hour backup	
8.5	Sockets	1-phase & 3-phase outlets	
8.6	Wiring	FRLS 1100V grade	
9.1	Air Conditioning	Split AC system	
9.2	Dehumidifier	Required	
9.3	Battery Room	Ventilation + hydrogen detection	
10.1	Earthing Standard	IS 3043 / IEEE 80	
10.2	Ground Pads	Two locations	
10.3	Lightning Protection	IEC 62305 compliant	
11.1	Fire Detection	Required	
11.2	Fire Extinguishers	Provided	
11.3	Fire Buckets	Minimum 6 nos	
11.4	Emergency Exit Marking	Radium marking	
12.1	E-House-1 Elevation	2 m above ground	
12.2	Cable Trench	Below E-House-1	
12.3	Corridor	Covered walkway	
12.4	Platforms & Railings	Provided	
13.1	FAT	Required at OEM	
13.2	iFAT	Integrated FAT at assembly	
13.3	Water Ingress Test	Mandatory	
13.4	Dust Test	Mandatory	
13.5	NDT Welding	Required	

	Test		
14.1	GA Drawings	Required	
14.2	Structural Drawings	Required	
14.3	Foundation Drawings	Required	
14.4	BOM	Required	
15.1	Solar PV System	Integrated with EMS/SAS	
15.2	Maintenance Plan	To be submitted	
15.3	Emergency Plan	To be submitted	
15.4	Tools & Spares	To be provided	
15.5	Warranty	To be provided	

TECHNICAL SPECIFICATION NO – A22 (33 kV isolators)

1.0 SCOPE

This specification provides for design, manufacture, inspection, packing and delivery of outdoor station type 36kV manual operating mechanism air break disconnects (Isolators) with earthing blades and complete in all respect with bi-metallic connectors and other accessories and auxiliary equipment for installations in Moran Power Station. The isolators will act as an isolating point between APDCL network and OIL's 33/11 kV substation. Operating mechanism, fixing details etc. shall be as described herein. The required civil jobs asscociated with the erection, installation of teh isolator will be under the scope of the supplier.

2.0 SERVICE CONDITIONS

The Isolators to be supplied against this Specification shall be suitable for satisfactory continuous operation under the following climatic conditions.

1	Location	Moran power station
2	Maximum ambient air temperature (°C)	45
3	Minimum ambient air temperature (°C)	2
4	Maximum average daily ambient air temperature (°C)	35
5	Maximum yearly weighted average ambient temperature(°C)	32
6	Maximum altitude above mean sea level (Metres)	1000
7	Maximum Humidity	93%
8	Average number of thunderstorm days	45->50
9	Average numbers of dust storms per annum	10
10	Maximum rainfall/annum	3500 mm
11	Average rainfall	2280 mm
12	Wind Pressure	97.8 Kg/Sq.mm
13	Altitude above MSL	100 m to 1000 m
14	Seismic Level	0.24g to 0.48g

Note: The equipment shall generally be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth unless otherwise specified.

3.0 SYSTEM CONDITIONS

The isolators shall be suitable for outdoor installation with 3-phase 50 Hz, 33kV systems and they should be designed suitable for service under fluctuations in supply voltage up to ±12%. Permissible under Indian Electricity Supply Act and rules made there under.

4.0 STANDARDS: The isolators and isolator-cum-earthling switches shall comply with the requirements of IS 9921 (as amended up to date) and the latest edition of IEC 62271-102 (IEC 60129). The Insulators shall comply with the requirement of latest edition of IS 2544/1973 and IEC 60168/1988 (as amended up to date)

Sr.No.	Standard No	Title
1	IS 9921 (Part 1 to 4)	Alternating Current Disconnectors (Isolators) and Earthing Switches for Voltages Above 1 000 V - Part I
2	IEC 62271-102 (IEC/ 60129)	Alternating current disconnectors and earthing switches
3	IEC 62271-1 (IEC 60694)	High-voltage switchgear and controlgear - Part 1: Common specifications
4	IS 2544/ IEC 60168	Porcelain post insulators for systems with nominal voltage greater than 1000 Volts
5	IS 5350	Dimensions of Indoor and Outdoor Porcelain Post Insulators and Post Insulator Units for Systems with Nominal Voltages Greater than 1000 V
6	IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
7	IS 4736	Hot-dip Zinc Coatings on Mild Steel Tubes
8	IS 4759	Hot-dip zinc coatings on structural steel and other allied products
9	IS 6745	Method for determination of mass of zinc coating on zinc coated iron and steel articles
10	IS 2633	Methods for testing uniformity of coating of zinc coated articles
11	IS 9530/1980	Recommended practice for silver plating
12	IS 5925/1970	Recommended practice for silver plating for general engineering purposes
13	BS 2816/1964	Testing of silver plating thickness
14	IS 6735/1994	Spring lock washers
15	IS 2016	Plain washers
16	IS 1161	Steel tubes for structural purposes
17	IS 1239	GI pipe('B' class or Medium class)
18	IS 2147	Degree of protection provided for enclosures for low voltage control gear
19	IS:4691	Degree of protection provided by enclosures for rotating electrical machinery

20	IS: 5561	Electrical Power Connectors

5.0 KEY TECHNICAL PARAMETERS:

The equipment covered in this specification shall meet the technical requirements listed below. The Isolator must be Double Break, center pole rotating type

Sl. No.	Parameter	Unit	Requirements for (33kV)
1	Rated Freq.	Hz.	50
2	System Neutral earthing		Solidly Earthed
3	No of pahses(Poles)	No	3
4	Temp. rise	Deg. C	As per standards IS/IEC
5	Safe Duration overload	Minutes	
6	150% of rated Current		5
7	120% of rated Current		30
8	Rated voltage	KV rms	36
9	Type of isolator		DBCR
10	Rated normal Current	AMPs	1250
11	Rated Short time withstand current for 3 secs	KA rms	25
12	Rated Peak Current	KA Peak	63
13	Rated Short Circuit Make current	KA Peak	63
14	Derating Factor		Unit
15	Lighting impulse withstand volatge		
16	Pole to earth & between poles	KV Peak	170
17	Across isolating distance	KV peak	195
18	Rated Power. Freq. withstand voltage	KV peak	
19	Pole to earth & between poles	KV rms	70
20	Across isolating distance	KV rms	80
21	Min.Creepager distance(The protected creepage distance shall not be less than 50% of total	mm	900
22	Phase to phased spacing for installation	mm	1500
23	Min. Clearances	mm	
24	Phase to earth	mm	430
25	Between rotating post and fixed post on one phase	mm	485
26	Height of center line of terminal pad above ground level	mm	3700

29	Special Requirements: Isolator main switch (MS) shall be required to make or break the line charging current when no significant change in voltage occurs across the isolating distance on account of make or break. The isolator required is not with "Turn and twist mechanism". It must be rotating type

6.0 GENERAL TECHNICAL REQUIREMENTS

6.1 TYPE & RATING Isolators shall have three posts per phase, triple pole single throw, gang operated out-door type silver plated contacts with horizontal operating blade and isolators posts arranged vertically. The isolators will be double break type. Rotating blade feature with pressure relieving contacts is necessary i.e. the isolator shall be described in detail along- with the offer. All isolators shall operate through 90 degree from their fully closed position to fully open position, so that the break is distinct and clearly visible from the ground level.

The equipment offered by the tenderer shall be designed for a normal current rating of 1250 A for 33 KV suitable for continuous service at the system voltage specified herein. The isolators are not required to operate under load but they must be called upon to handle magnetization currents of the power transformers and capacitive currents of bushings, bus-bars connections, very short lengths of cables and current of voltage transformers.
The rated insulation strength of the equipment shall not be lower than the levels specified in IS 9921 IEC publication No. IEC 62271-102 (IEC 60129), which are reproduced below:

Standard declared voltage kv/rms	Rated voltage of the Isolator	Standard withstand positive kV (peak)	Impulse Voltage polarity	One minute power frequency withstand voltage KV (RMS)	
		Across the isolating distance	To earth and between poles	Across the isolating distance	To earth and between poles
33 kV	36	195	170	80	70

33 KV isolators are required with post insulators but with mounting structures. The isolators should be suitable for mounting on the Boards standard structures. The isolators shall be supplied with base channels along with fixing nuts, bolts and washers for mounting on the structured.

6.2 TEMPRATURE RISE

The maximum temperature attained by any part of the equipment when in service at site under continues full load conditions and exposed to the direct rays of Sun shall not exceed 45 degree centigrade above ambient temperature.

6.3 ISOLATOR INSULATION

Isolation to ground, insulation between open contacts and the insulation between

phases of the completely assembled isolating switches shall be capable of withstanding the dielectric test voltage specified above.

6.4 MAIN CONTACTS

All isolators shall have heavy duty self-aligning and high pressure line type fixed contacts of modern design and made of hard drawn electrolytic copper. The fixed contact should be of reverse loop type. The various parts shall be accordingly finished to ensure interchangeability of similar components. The fingers of fixed contacts shall be preferably in two pieces and each shall form the reverse loops to hold fixed contacts. The fixed contacts would be placed in 'c' clamp. The thickness of 'C' clamp shall be adequate. This channel shall be placed on a channel of adequate thickness. This channel shall be welded on an insulator mounting plate of 8mm thickness. The spring of fixed contact shall have housing to hold in place. This spring shall be made of stainless steel with adequate thickness. The pad for connection of terminal connector shall be of AluminIum with thickness not less than 12 mm. The switch blades forming the moving contacts shall be made from tubular section of hard drawn electrolytic copper having outer diameter not less than 38 mm and thickness 3 mm. These contacts shall be liberally dimensioned so as to withstand safely the highest short circuit and over voltage that may be encountered during service. The surfaces of the contacts shall be rendered smooth and silver plated. The thickness of silver plating shall not be less than 25 microns for 33 KV. In nut shell, the male and female contact assemblies shall be of robust construction and design of these assemblies shall ensure the same.

a) Electro-dynamic withstands ability during short circuit without any risk of repulsion of contacts.
b) The current density in the copper parts shall not be less than 2 Amp/sq.mm and aluminium parts shall be less than 1 Amp / sq.mm.
c) Thermal withstand ability during short circuit.
d) Constant contact pressure even when the live parts of the insulator stacks are subjected to tensile stresses due to linear expansion of connected bus bar of flexible conductors either because of temperature verification or strong winds.
e) Wiping action during closing and opening.
f) Self-alignment assuring closing of the switch without minute adjustment.
The earthing switch should be provided with three sets of suitable type of fixed contacts below the fixed contacts assemblies of the main switch on the incoming supply side and the sets of moving contacts having ganged operation. These contacts shall be fabricated out of electrolytic copper for 33 KV isolators with earth switch and designed to withstand current on the line.
Arcing contacts/Horn: Arcing contacts are not required.
Auxiliary switches: Auxiliary switches are required

6.5 CONNECTORS:

The connectors for 33 KV isolator shall be made of Aluminium alloy LM-9 or LM-25 and shall be suitable for Wolf conductors for 33 KV with horizontal and vertical takeoff arrangement. The details in regard to dimensions, the number of bolts to be provided, material and manufacture shall be furnished by the bidder for owner approval before manufacturing. The groove provided in the connection should be

able to accommodate conductor size mentioned above smoothly. The clamps to be offered should be manufactured by gravity die-casting method only and not by sand casting process. It is necessary that suitable clamps are offered along with the isolator and also it is obligatory to give complete technical particular of clamps along with the drawing, as per details given above and also as per following detail:

a) The terminal connector shall be manufactured and tested as per IS: 5561.
b) All castings shall be free from blow holes, surface blisters, cracks and cavities.
c) All the sharp edges shall be blurred and rounded off.
d) No part of the clamp shall be less than 12 mm thick.
e) All current carrying parts shall be designed and manufactured to have minimum contact resistance.
f) Connectors shall be designed to be corona free in accordance with the requirement of IS: 5561.
g) All nuts and bolts shall be made of stainless steel only. Bimetallic sleeve/liner shall be 2 mm thick Wherever necessary, bi-metallic strip of standard quality and adequate dimension shall be used.

6.6 POST INSULATOR

33KV insulators shall be of reputed make subject to owner approval.33 KV isolators, two numbers 33 KV insulators per stack and 9 stacks shall be supplied with each isolator. The insulator stack shall conform to the latest applicable Indian or IEC standard and in particulars to the IS: 2544 specification for porcelain post insulators. The porcelain used for manufactures of insulators shall be homogeneous, free from flaws or imperfections that might affect the mechanical or dielectric quality, and they shall be thoroughly vitrified, tough and impervious to moisture. The glazing of the porcelain shall be uniform brown colour, free from glisters, burns and other similar defects. Insulators of the same rating and type shall be interchangeable.
The porcelain and metal parts should be assembled in such a manner that any thermal expansion differential between the metal and the porcelain parts throughout the range of temperature variation shall not loosen the parts or create undue internal stresses which may affect the electrical or mechanical strength and rigidity. Each cap and base shall be of high-grade cast steel or malleable steel casting and they shall be machine faced and smoothly galvanized. The cap and base of the insulators shall be interchangeable with each other.
The tenders shall in variably enclose with the offer, the type test certificate and other relevant technical guaranteed particulars of insulators offered by them. Please note that isolators without type test certificates will not be accepted.

Each 11KV / 33KV Post Insulators used in the isolators should have technical particulars as detailed below:

Sr.No.	Particulars	33 kV
1	Nominal system voltage kV (rms)	33
2	Highest system voltage KV (rms)	36
3	Dry P.F. One minute with stand KV (rms)	75
4	Wet PF one minute withstand KV	75

	(rms)	
5	P.F. Puncture withstand test voltage KV	1.3 times the actual dry flash over voltage of the unit
6	Impulse voltage withstand test KV (peak)	170
7	Visible discharge test KV voltage	27
8	Creepage distance mm (min)	900
9	Tensile strength in KN	16
10	Short time current rating for 3 Secs KA	25

For 33 KV Isolators: In place of 33 KV Post Insulator the composition of 2 units of 22KV Post Insulators per stack complying with the following parameters are acceptable:

1	Nominal system voltage	33 kV
2	Highest system voltage	36 KV
3	Impulse voltage withstand	170 kV
4	Power frequency wet withstand voltage	75 kV
5	Height of stack	500 mm
6	Creepage distance (Minimum)	900 mm
7	Tensile Strength	30 kN

6.7 OPERATING MECHANISM FOR 33KV ISOLATORS:

All Isolators and earthing switches shall have separate dependent manual operation. The Isolator should be provided with padlocking arrangements for locking in both end position to avoid unintentional operation. For this purpose Godrej make 5 lever brass padlocks having high neck with three keys shall be provided. The isolating distances should be visible for isolators. The Isolators and Isolators with earth switch inclusive of their operating mechanism should be such that they cannot come out of their open or close position by gravity wind pressure, vibrations reasonable shocks or accidental touching of connecting rods of the operating mechanism. Isolators should be capable of resisting in closed position, the dynamic and thermal effects of maximum possible short circuit current at the installation point. They shall be so constructed that they do not open under the influence of the short circuit current. The operating mechanism should be of robust construction and easy to operate by a single person and conveniently located for local operation in the switchyard. Provision for earthing of operating handle by means of 8 SWG GS wire must be made.

6.8 PIPES

Tandem pipes operating handle shall be class BIS marked type having atleast 24mm internal diameter for 33KV isolator. The operating pipe shall also be class B ISI marked with internal diameter of atleast 38 mm for 33KV isolators respectively.

The pipe shall be terminated in to suitable universal type joints between the

insulator bottom bearing and operating mechanism.

6.9 BASE CHANNEL

The Isolator shall be mounted on base fabricated from steel channel section of adequate size not less than 100x50x6 mm for 33KV. To withstand total weight of isolator and insulator and all the forces that may encounter by the isolator during services, suitable holes shall be provided on this base channel to facilitate it's mounting on our standard structures. The steel channel in each phase shall be mounted in vertical position and over it two mounting plates atleast 8mm thick with suitable nuts and bolts shall be provided for minor adjustment at site.

6.10 CLEARANCES

We have adopted the following minimum clearance for isolators in our system. The bidder should therefore keep the same in view while submitting their offers:

Description	Center distance between Poles (Center to Center) i.e. Phase to Phase	clearance Distance between center lines of outer posts on same pole
33 KV Isolator	12 cm.	96 cm

7.0 TYPE TESTS

7.1 The equipment offered, shall be fully type tested as per the relevant standards. Copy of the same shall be submitted to OIL before commencement of manufacturing.

7.4 The type tests shall be conducted on the isolator along with approved insulators and terminal connectors.

7.5 Mechanical endurance test shall be conducted on the main switch as well as earth switch on one disconnect of each type.

8.0 **PERFORMANCE GUARANTEE:**

The equipment shall be guaranteed for satisfactory performance for a period of 66 months from the date of receipt at site in good condition or 60 months from the date of commissioning, whichever is earlier. In case of failure within this period the supplier will make good the faulty equipment at no extra cost to the purchaser.

9.0 **DOCUMENTATION:**

9.1 All drawings shall conform to international standards. All dimensions and data shall be in System International units.

9.2 List of drawings and documents: Two(02) sets of following drawings shall be submitted to OIL along with delivery of the materials:

a. General outline and assembly drawings of the isolator, operating mechanism, structure, insulator and terminal connector.

b. Sectional views and descriptive details of items such as moving blades, contacts, arms, contact, pressure, contact support, bearing, housing of bearings, bushes, balancing of heights, phase coupling pipes, base plate, operating shaft, guides, swivel joint operating mechanism and its components, etc.

c. Drawings with structure for the purpose of type tests.

d. Name plate.
e. Schematic drawing
f. Type test reports in case the equipment has already been type tested.
g. Test reports, literature, pamphlets of the bought out items, and raw material.

9.3 The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk.

9.4 Approval of drawings/work by purchaser shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the latest revision of applicable standards, rules and codes of practices.

10.0 **INSTRUCTION MANUALS:**

Two(ins02) copies of the erection, operation and maintenance manuals in English shall be supplied. The manual shall be bound volume and shall contain all drawings and information required for erection, operation and maintenance of the isolator including but not limited to the following particulars:

a. Marked erection prints identifying the component parts of the disconnect as shipped with assembly drawings.
b. Detailed dimensions and description of all auxiliaries.
c. Detailed views of the insulator stacks, metallics, operating mechanism, structure, interlocks, spare parts etc.

GTP-18: 33 KV ISOLATORS

Sl. No.	Particulars	Unit	OIL Requirement	Bidder Offer
1	Manufacturer's Type / Designation / Installation			
2	Manufacturer's Name & Works Address			
3	Applicable Standards (IS/IEC)			
4	Type of Disconnector			
5	Rated Voltage	kV	33	
6	Highest System Voltage	kV	36	
7	Rated Frequency	Hz	50	
8	Type of Isolator	-	Outdoor, Gang Operated	
9	Continuous Current Rating	A	1250 (or as per tender)	
10	Short Time Withstand Current (3 sec)	kA	25	
11	Peak Withstand Current	kAp	62.5	
12	Lightning Impulse Withstand Voltage	kVp	170	
13	Power Frequency Withstand Voltage	kVrms	70	
12	Number of Breaks per Pole	Nos.	As per OEM design	
13	Number of Insulators per Pole	Nos.	As per OEM design	
14	Creepage Distance	mm	As per IS/IEC	
15	Contact Material	-	Silver plated copper	
16	Moving Blade Material	-	High conductivity copper	
17	Terminal Pad Material	-	Copper/Aluminium alloy	
18	Operating Mechanism	-	Manual Gang Operation	
18	Interlocking Arrangement	-	Required	
19	Hardware	-	Hot dip galvanized	
21	Type Test Reports	-	To be furnished	
21	Drawings & Catalogues	-	To be furnished	

TECHNICAL SPECIFICATION NO – A23
LIGHTNING ARRESTOR AND SURGE COUNTER

1.0 SCOPE OF WORK:

(a) The scope of work under this contract shall include the design, supply, installation, testing and commissioning of Lightning Arresters complete with surge counters for protection of equipment in the 33 kV system against lightning and switching over voltages. The contractor shall provide all materials, equipment, accessories, mounting arrangements, interconnections, earthing conductors, hardware, and associated works required for complete installation and satisfactory operation of the lightning arrester system at the substation.

(b) The Lightning Arresters (LA) to be installed shall be gapless metal oxide type with zinc oxide (ZnO) non-linear resistor blocks, suitable for outdoor substation service and designed for continuous operation on a 33 kV (36 kV class) effectively earthed system. The arresters shall conform to the latest editions of IEC 60099-4 / IS 3070 (Part-3) or other internationally accepted standards. The arrester housing shall be polymer or porcelain type, weather resistant, UV resistant and suitable for operation in tropical climatic conditions with high humidity, dust and pollution levels. The Lightning Arrester (LA) shall be installed in the outdoor yard at the 33 kV cable termination point where the system is connected to the utility network, to provide protection against lightning and switching surges entering from the grid.

(c) The rated voltage of the Lightning Arresters shall be appropriately selected for a 33 kV system and shall possess adequate energy absorption capability and low residual voltage characteristics to effectively protect substation equipment from lightning impulses and switching surges.

(d) Each Lightning Arrester shall be provided with a surge counter with leakage current monitoring facility, which shall be installed in the earthing lead between the arrester base and the station earth grid. The surge counter shall record the number of discharge operations of the lightning arrester and shall facilitate monitoring of arrester condition. The device shall be self-powered, preferably using solar cells or equivalent internal energy sources and shall not require any external power supply. The surge counter shall register discharge currents exceeding a threshold value (generally about 10 A for an 8/20 μs impulse) and shall display the cumulative number of operations through a clear electronic or LCD display visible under daylight conditions.

(e) The surge counter shall also provide a facility for measurement of leakage current of the lightning arrester, typically within the range of 0.1 mA to 50 mA, to assist in periodic health monitoring of the arrester. The counter enclosure shall be sealed, weatherproof and suitable for outdoor application with a minimum protection level of IP67. The device shall be capable of withstanding the short-circuit current of the arrester earth path (minimum 65 kA) without mechanical or electrical damage and shall not adversely influence the protective characteristics or residual voltage of the lightning arrester.

(f) The Lightning Arresters shall be installed as close as practicable to the equipment being protected, such as 33 kV incoming lines, transformers, busbars or cable terminations, and the connections between the line conductor and arrester terminal shall be kept as short and straight as possible to minimize inductive effects during surge discharge. The earth lead from the arrester shall be directly connected to the station earthing grid through the surge counter, using adequately sized copper or GI earth conductor to ensure a low impedance discharge path.

(g) The contractor shall carry out erection, alignment, connection to the 33 kV system, installation of surge counters, and connection to the station earthing system in accordance with manufacturer's recommendations and good engineering practices. All necessary mounting structures, clamps, connectors, nuts, bolts, washers and installation accessories required for proper installation shall be included within the scope of supply.

(h) Upon completion of installation, the contractor shall perform inspection and commissioning checks, including verification of proper installation, mechanical integrity, earthing continuity, insulation clearances and correct functioning of the surge counter display. All equipment supplied shall be new, of proven design and manufactured by reputed manufacturers, ensuring reliable protection of the 33 kV substation equipment from lightning and surge over voltages.

TECHNICAL SPECIFICATION NO – A24
EARTHING SYSTEM

1. SCOPE:

The contractor shall design, supply, install, test and commission a complete earthing and equipotential bonding system for the 33/11 kV E-House substation. The substation consists of indoor equipment installed inside an elevated prefabricated E-House structure approximately 2 m above ground level and outdoor equipment including two numbers 5 MVA oil filled transformers, Neutral Grounding Resistor (NGR) and APFC capacitor bank. The earthing system shall include perimeter earth ring, earth electrodes, equipment earthing, transformer earthing, lightning protection earthing, solar plant earthing, and earth for control and automation systems. The design, materials and installation practices shall comply with IS 3043 Code of Practice for Earthing and applicable provisions of Central Electricity Authority safety regulations.

2. Earthing Philosophy for Elevated E-House:

Since the E-House is installed approximately 2 m above ground level, installation of a dense buried earth mat directly below the structure may not be practical. Therefore the earthing system shall be based on a perimeter earth ring conductor combined with multiple earth electrodes and equipotential bonding of the entire E-House structure. The system shall ensure safe dissipation of fault current, control of touch and step potential and reliable grounding reference for electrical and electronic systems.

However any other configuration of the earthing system which is technically feasible and follows the standard IS 3043 and regulation of CEA can also be implemented.

3. Perimeter Earth Ring:

A closed earth ring conductor shall be installed around the perimeter of the E-House building and interconnected with the overall substation earthing network. The earth ring shall be constructed using hot dip galvanized mild steel flat of minimum size 50 mm × 6 mm. The earth ring shall form the primary grounding network for the E-House and shall be connected to earth electrodes at regular intervals.

4. Earth Electrodes:

Multiple earth electrodes shall be installed along the perimeter earth ring to achieve the desired overall earth resistance. Electrodes shall normally consist of GI pipe of minimum 40 mm diameter and minimum length of 3 m or longer depending on soil resistivity. Earth electrodes shall be installed at spacing typically between 6 m and 10 m along the earth ring. Each earth electrode shall be provided with suitable backfill material such as charcoal, salt or bentonite compound to improve conductivity. Each earth pit shall be provided with a masonry chamber with removable CI cover and test link for measurement of earth resistance.

5. Earth Resistance Requirement:

The earthing system shall be designed such that the overall earth resistance of the substation earthing network does not exceed 1 Ohm or the value required by applicable standards. The design shall ensure that touch potential and step potential remain within safe limits as specified in IS 3043.

6. E-House Main Earth Bar and Equipotential Bonding:

A main earth bar made of copper of minimum size 50 mm × 6 mm shall be installed inside the E-House. This main earth bar shall be connected to the external earth ring at a minimum of two separate locations using suitable earthing conductors. All indoor equipment including switchgear panels, control panels and auxiliary systems shall be connected to this earth bar. All metallic components of the E-House structure including structural frames, floor plates, cable trays, HVAC units, metallic doors, ladder trays and support structures shall be bonded to the earthing system to ensure equipotential bonding within the building.

7. Indoor Equipment Earthing:

All indoor electrical equipment such as 33 kV AIS switchgear panels, 11 kV AIS switchgear panels, LT panels, grid synchronization panels, UPS panels, battery charger panels, control panels, SAS panels, EMS panels and communication equipment racks shall be connected to the E-House earth bar. Major switchgear panels shall have at least two independent earthing connections wherever applicable. GI strip of minimum size 50 mm × 6 mm shall normally be used for switchgear earthing while smaller equipment may be connected using GI strip not smaller than 25 mm × 6 mm.

8. Earthing for Control and Automation Systems:

A separate earth bus made of copper strip of minimum size 25 mm × 3 mm shall be provided inside the E-House for sensitive electronic equipment. Equipment such as Substation Automation System panels, Energy Management System servers, RTU panels, network switches, communication racks and SCADA interface equipment shall be connected to the clean earth bus. The clean earth bus shall be connected to the main earthing system at a single point to minimize electrical noise and interference.

9. Transformer Earthing:

Each 5 MVA outdoor power transformer shall be provided with dedicated earthing connections for transformer tank, marshalling box and associated accessories. Transformer tank earthing shall consist of two independent GI strips of minimum size 50 mm × 6 mm connected to the main earthing network. A local grounding grid or earth ring shall be provided around the transformer foundation where required and shall be connected to the main perimeter earthing system.

10. Neutral Grounding Resistor Earthing:

The Neutral Grounding Resistor shall be connected to the earthing system through a dedicated earth electrode or electrode group capable of carrying the maximum earth fault current for the specified duration. The connection shall normally be made using GI strip of minimum size 50 mm × 6 mm.

11. APFC Capacitor Bank Earthing:

The outdoor APFC capacitor bank structure and enclosure shall be connected to the earthing system at a minimum of two points using GI strip of minimum size 50 mm × 6 mm.

12. Solar PV System Earthing:

The rooftop solar PV system shall have dedicated earthing for module mounting structures, inverter body, AC distribution board and DC distribution board. Earthing shall be connected to the main earthing network using GI strip of minimum size 25 mm × 6 mm and additional earth electrodes shall be provided as required.

13. Lightning Protection:

The E-House shall be protected against lightning in accordance with IS 2309. Air termination rods, down conductors and lightning earth electrodes shall be provided. Down conductors shall normally consist of GI strip of minimum size 25 mm × 6 mm and shall be connected to dedicated lightning earth pits which shall be bonded with the main earthing network.

14. Cable Earthing:

All power cable armours shall be effectively earthed at both ends. Shielding of control cables shall normally be earthed at one end only to avoid circulating currents and interference.

15. Testing and Documentation:

After completion of installation the contractor shall carry out earth resistance measurement, earth continuity testing and verification of equipotential bonding using approved digital earth resistance testers. The contractor shall submit earthing design calculations, earthing layout drawings, earth electrode location drawings, equipment earthing schematics, lightning protection layout and final as-built drawings along with test reports.

16. Design of Earthing System:

Calculate the Step and Touch potential for the system and earthing system shall be designed in compliance with IS 3043.

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Specification No: A 25 (Civil Works)

1.0 Scope of Civil Works

a) The scope of this work includes detailed planning, structural analysis, designing, site preparation, earth filling & levelling with concrete paver block, construction of RCC foundation for different equipment of the 33/11 KV (E-house) Substation along with Fire brick Wall, oil pits for transformer, cable trenches, drainage system for the sub-station , approach path as per layout, earthing pits etc. All necessary material required for the work shall be supplied by the contractor.

b) The bidder shall be fully responsible for the structural adequacy, safety and integration of all civil works with electrical, mechanical and earthing systems of the substation.

2.0 Codes, Standards, and Design Basis

a) All civil design and construction activities shall conform to the latest editions of applicable Indian Standards (IS), National Building Code (NBC), and relevant CPWD/PWD specifications.

b) The design shall consider equipment loads, impact loads, seismic forces, wind loads, drainage requirements, oil containment, and future maintenance access.

c) In case of conflict between standards or specifications, the more stringent requirement shall govern.

3.0 Site Preparation, Levelling, and Earthwork

a) The bidder shall carry out clearing, grading, levelling, excavation, filling, and compaction of the substation site to achieve the required formation level suitable for a 33/11 kV substation.

b) Surplus excavated material shall be disposed of within designated locations approved by the Owner.

4.0 Design:

Considering superstructure load, soil condition etc. foundations design to be done by the bidder and design & drawings are to be submitted at OIL INDIA LIMITED for approval. Available soil test report is attached with this specification as attachment **A25.1**. for reference of the bidder. Any additional data required by the bidder for civil design shall be in the scope of the bidder.

5.0 Civil works execution

a) The scope includes design and construction of RCC foundations for all substation structures including, but not limited to, E-houses, outdoor equipment, gantries and structural steel supports.

b) Foundation design shall be based on safe bearing capacity of soil, seismic zone and equipment loading and shall include all inserts, anchor bolts, sleeves and cable entry provisions.

c) The E-house with Electrical Switchgear and other sub system to be designed & erected (Floor Finish Level) at a minimum 2.0m height (raised platform) from the finished ground level.

d) Detail structural analysis and design of RCC/Steel supports/Connections/pillar/column conforming to relevant BIS codes (Latest revision) using STAAD PRO software. STAAD MODEL to be provided to OIL for checking and verification by OIL. Preparation of working drawings showing detail of structural components in AutoCAD Software. 3 (Three) sets of hard copies are to be submitted and copies of working drawings as required during execution of the work.

e) Construction, including supply of all materials, equipment, system and services to complete the work in all respect, as per the approved detail working drawings including preliminary site development works will be under the scope of bidder.

f) Quality control and quality assurances: This includes furnishing all statutory certificates/documents related to quality/specification of the various components installed/commissioned in the project. Acquiring the statutory certificates /documents from the regulatory bodies/suppliers is the responsibility of the contractor. All laboratory tests, field tests shall be carried-out as per the Project Requirement and relevant IS Codes, SOPs, CPWD Specifications and as advised by the Civil Engineering Department of OIL during the Contract Period.

g) Undertake full responsibility for the engineering design prepared by them with respect to adequacy and technical soundness for the structure. They shall be responsible for the structural and/or any defects due to faulty design.

5.1 Equipment Foundations

a) The bidder shall design and construct foundations for all major equipment associated with the 33/11 kV substations including E-House , Power Transformers, Neutral Grounding Resistors (NGRs), capacitor banks and other outdoor-mounted equipment.

b) Transformer foundations shall be designed considering static loads, dynamic loads, vibration effects, and oil containment requirements.

c) RCC foundation: To support the porta cabin (E-House), RCC pedestal type cast in situ type foundations (pillar) should be designed considering 2.0 m above the top RCC Concrete Pedestals. The area below the E-Houses shall be made CC (150 mm thick & prop 1:3:6) over properly compacted /prepared sub grade (prepared with 150 mm thick GSB/150 mm thick Gravelling). Construction of foundations to support the cabin, CC below the cabin & drain is within the scope of the contractor. All machinery & materials required for construction of foundations to be arranged by the contractor.

5.2 Fire brick Wall:

A) The oil filled power transformer shall be separated by fire brick wall as per CEA guidelines and IS-1646.

5.3 Oil Pits and Earthing Pits

a) RCC oil collection pits shall be provided for power transformers, complete with oil-water separation arrangements and proper slope for oil drainage.
b) Earth pits shall be constructed as per approved earthing layout and IS standards, ensuring long-term reliability of the earthing system.

5.4 Cable Trenches

a) The scope includes design and construction of RCC cable trenches for routing power, control, and communication cables across the substation.
b) Cable trenches shall be provided:
   1. Between the E-house and outdoor equipment including tap off point (APDCL) and
   2. Between the E-house and GEG cable trench.
c) The scope shall also include cable trench/tray beneath the E-house,
d) Cable trench dimensions shall be adequate for accommodation of cables laid during project as well as provision for future expansion.

5.5 Drainage System

a) A storm water drainage system shall be designed and constructed for the substation yard, E-House, cable trenches, and oil pits.
b) The drainage system shall be hydraulically designed to prevent waterlogging and shall be connected to the existing drainage network.
c) The system shall include drains, slopes, silt traps, inspection chambers, and discharge points as required.

5.6 Fencing and Outdoor Area Protection

a) The scope includes design, supply, and installation of fencing for outdoor substation equipment – Power Transformer, NGR, Capacitor bank etc.
b) Fencing shall be suitable for electrical substations and shall include gates, supports, foundations, and earthing continuity.
c) Fence height, type (chain link / welded mesh), and clearances shall comply with relevant IS standards and utility practices.

6.0 Interface and Coordination

a) The bidder shall coordinate all civil works with electrical, mechanical and earthing layouts to ensure clash-free execution.
b) Any civil works arising due to interface requirements shall be deemed included within the scope.

7.0 Quality Control and Documentation

a) The bidder shall implement a quality assurance plan covering material testing, workmanship and inspections.
b) Mandatory tests shall include soil compaction tests, concrete cube tests, and material quality verification.

c) Contractor shall have to furnish the necessary test certificates from Govt. approved test laboratory at his own cost for reinforcement bars, RCC, structural steel works and for any other materials as advised by Engineer-in-charge.

d) The bidder shall submit design calculations, construction drawings, as-built drawings and completion certificates as part of project handover.

8.0 **Scope Completeness**

Unless specifically excluded, all civil works required for a complete, safe and operational 33/11 kV E-House substation shall be deemed included in the bidder's scope.

9.0 **General Note:**

i. The contractor shall fully familiarize himself with the lay out conditions and general arrangements and scheme etc. before preparing conceptual lay out plan of the E-Houses including the locations of equipment. The contractor is advised to visit the site and acquaint themselves with the topography, infrastructure and also the design philosophy.

ii. The contractor based on conceptual layout plan shall do the complete work of design and detailed engineering.

iii. All civil works shall be carried out as per relevant IS codes. All materials required for civil works are to be supplied by the contractor and shall be of best quality conforming to relevant Indian Standards and Codes.

iv. The Contractor shall furnish/provide all temporary works, transportation and all other incidental items not shown or specified but as may be required for complete performance of the Works in accordance with approved drawings, specifications.

v. The contractor shall provide all labours, supervisions, transport and such specified materials, required for executing the including tools and plants as necessary for the work and shall be responsible for all royalties and other levies and his rates shall include for these. The work executed and materials supplied shall be to the satisfaction of the Company's Engineer and Contractor's rates shall include for all incidental and contingent work which although not specifically mentioned in this contract are necessary for its completion in a sound and workman like manner.

vi. The Contractor shall clear away all rubbish and surplus material from the site on completion of work and shall leave the site clean and tidy.

vii. The Company's Engineer shall have power to:

(a) Reduce payments if the quality of work although acceptable is not up to the required standard set forth in the Particular Specifications which have been perused and fully understood by the Contractor.

(b) Order the Contractor to remove any inferior material from the site and to

demolish or rectify any work of inferior workmanship, falling which the Company's Engineer may arrange for any such work to be demolished or rectified by any other means at the Contractor's expenses.

(c) Order the Contractor to remove or replace any workman who he (The Engineer) considers incompetent or unsuitable; the Engineer's opinion as to the competence and suitability of any workman engaged by the Contractor shall be final and binding on the Contractor.

(d) Order the Contractor from time to time during the progress of the work further drawings necessary for the purpose of proper and adequate execution and maintenance of the works and the Contractor shall carry out and be bound by the same.

(e) Order deviations of this Contract arising due to non-availability in working drawings, change in specification of materials/works shall be in writing and financial effect, if any, of such deviation shall be worked out on-the-basis of the rates appearing in OIL's Schedule of Rate/CPWD (DSR) in force on the date of issue of such Deviation Order.

(f)The contractor shall have no claim against the Company in respect of any work which may be withdrawn but only for work completed under this contract. The Contractor shall have no claim to any further payment whatsoever. The valuation would be carried out ex parte if Contractor fails to turn up despite responsible notice which will be binding on the Contractor.

10.0 **The Contractor shall undertake to indemnify the Company against all claims which may arise under the under noted Acts/Code:-**

(i) The Occupational Safety, Health and Working Condition Code 2020

(ii) The Code on Wages,2019

(iii) The Workman Compensation Act, 1923.

(iv) The Payment of Wages Act. 1963.

(v) The Payment of Bonus Act, 1965.

(vi) Inter-State Migrant (Regulation of Employment and Condition of Service) Act, 1979.

(ix) The Employees Provident Fund and Miscellaneous Provisions Act, 1952.

(x) GST

(xi) Building and Other Construction Workers Welfare Cess Act 1996.

or any other Acts or Status not here in above specifically mentioned having bearing over engagement of workers directly or indirectly for execution of work. The Contractor shall not make the Company liable to reimburse the Contractor for the statutory increase in the wage rates of the Contract Labour appointed by the

Contractor. Such statutory increase in the wage rates of Contract Labour shall be borne by the Contractor.

10.1 The Contractor will arrange at his own cost cleaning and grass removing of area allotted, construction of temporary office/stores, cement godown, fabrication yards etc and also the watch & ward of all the above. However contractor shall not be allowed to construct any structure (for storage /housing purpose) with thatch, bamboo or any other inflammable materials within any Company's fenced area.

10.2 The Contractor shall ensure that all men engaged by him/her are provided with appropriate protective clothing and safety wear in accordance with relevant OIL mines Regulations. The Company's representative shall not allow/accept those men who are not provided with the same.

10.3 All Statutory taxes levelled by the Central and State Government or any other competent authority from time to time will be borne by Contractor and the amount of the Contract specified in the Contract is inclusive of all tax liabilities.

However, any subsequent increase in such statutory taxes after bid opening day will be borne by the Company. Similarly, if there is any decrease in such statutory taxes after bid opening day, the Company shall recover the decreased amount of such taxes from the Contractor.

10.4 The Contractor shall deploy local persons in all works.

10.5 The Contractor shall not engage minor labour below 18 (eighteen) years of age under any circumstances.

10.6 The Contractor and his/her workmen shall strictly observe the rules and regulations as per Mines Act (latest edition).

10.7 The Contractor will be required to allow OIL Officials to inspect the work site and documents in respect of the workers' payment.

10.8 All safety precautions to be maintained by the Contractor at his own cost as per safety rules and regulations.

10.9 The Contractor shall use pump if needed for dewatering of pit while excavation for which no extra payment will be made.

10.10 The Contractor shall have to work during rainy seasons also. Required plan and equipment arrangement is under the scope of the contractor.

10.11 Watch and ward, loss or damage to Company property, theft and other incidental charges shall be Contractor's responsibility.

10.11 Efficient workmen to be engaged by the Contractor.

10.12 Materials if rejected should be removed from site within 48 (forty eight) hours of rejection, failing which the Company reserves the right to get the rejected materials removed at the risk and cost of the Contractor.

10.13 Water that may accumulate on the site during progress of the works or in trenches and excavations from other than accepted risks shall be removed from the site to entire satisfaction of the Engineer-in-Charge and at the Contractor's expense.

10.14 If needed water and electricity will have to be arranged by the Contractor at his own cost.

10.15. The Contractor and his workmen shall strictly observe the safety precautionary rules while executing the work.

10.16. The Contractor shall have to provide temporary toilet facilities in the entire work site for use of their workmen during progress of work.

10.17 In case of any doubt or dispute as to the interpretation of any clause herein contained, the decision of the Company's Engineer shall be final and binding on the contractor.

10.18 Contractor shall have to furnish the necessary test certificates from Govt. approved test laboratory at his own cost for reinforcement bars, RCC, structural steel works and for any other materials as advised by Engineer-in-charge.

10.19 MEASUREMENT & PAYMENT: Payment for all works done shall be made based on actual work done as per the schedule of payment.

11. **Forest Royalty:**

(i) As per Notification No. PEM 13O/2O21140 dated 7th October,2021 of Govt. of Assam or latest publication, for Assam Minor Mineral Concession Rules, 2013, royalties and contribution towards 'Minor Minerals", "District Mineral Foundation Trust Fund" (DMFT) and "Mines artd Mineral Development, Restoration and Rehabilitation Fund" (MMDRRF) to be deposited as applicable directly through the website www.assamlbrcstonline.in.

(ii) As per Notification No. PEM 13O/2021/55 Dated 16th December, 2O2l or latest publication, in addition to the royalties, a sum of 10% of the royalty as per the 3rd schedule must be deposited in each of the District Mineral Foundation Trust (DMF'I)and Mines and Mineral Development Restoration and Rehabilitation Fund (MMDRRI).

(iii) The Contractor will be liable to ensure to have registered in the portal www.assamforestonline.in and to submit self-attested copy of the corresponding Forest Royalty, DMFT & MMDRRF against the project. Contractor will be responsible for procurement of material in its own registration and to issue its own e-challan as applicable.

(vi) OIL will reimburse the amount at actuals against submission of self-attested copy of e-challan/receipt/certificates generated from the portal along with running bills.

(v) However, OIL will release the final bill only after ensuring that all relevant certificates issued by concerned authority against payment of Forest Royalty, DMFI & MMDRRF are submitted by the contractor.

TECHNICAL SPECIFICATION NO – A26
MANDATORY SPARE PARTS:

1.0 The Bidder shall give assurance that special maintenance tools & tackles and spares will continue to be available throughout the life of the equipment, which shall be 25 years minimum. However, the supplier shall give a minimum of 12 months' notice in the event of plan to discontinue the manufacture of any component used in this equipment. Following minimum list of spares shall be provided:

Minimum spare list			
SR.NO.	Item	Spares	Quantity
1	Switchgear (33 kV)	Trip Coil & Closing Coil of VCB	Min. 5 nos
		TNC switch	Min 5 nos
		Indication lamp	Min 10 % of total
		Numerical Relay	Min 1 of each type
		CTs & PTs	Min 1 of each type
		TBs	Min 10 % of total
		MFM	Min 2 Nos
		SMPS	Min 2 Nos
		Transducer (If any)	Min 2 Nos
		Support Bushing	Min 5 nos
		MCBs	Min 2 Nos of each type
		Auxiliary Contactor	Min 5 nos
		Loca-remote Switch	Min 5 Nos
		Contact Multiplier	Min 5 nos
		VCB (33 kV)	1 No.
2	Switchgear (11 kV)	Trip Coil & Closing Coil of VCB	Min. 5 nos
		TNC switch	Min 5 nos
		Indication lamp	Min 10 % of total
		Numerical Relay	Min 1 of each type
		CTs & PTs	Min 1 of each type
		TBs	Min 10 % of total
		MFM	Min 2 Nos
		SMPS	Min 2 Nos
		Transducer (If any)	Min 2 Nos
		Support Bushing	Min 5 nos
		MCBs	Min 2 Nos of each type
		Auxiliary Contactor	Min 5 nos
		Loca-remote Switch	Min 5 Nos
		Contact Multiplier	Min 5 nos
		VCB (11 kV)	1 No.
3	Transformer	RTDs	Min 5 Nos
		Valve	Min 2 Nos

		Gasket	Min 1 sheet
		MCBs	Min 1 of each type
		Breather	Min 1
4	LT Switchgear	MCCBs	Min 1 of each type
		Control Transformer	Min 1
		MCCB Handles	Min 2
		Meters	Min 1
		Indication Lamp	Min 10 % of total
		TBS	Min 10 % of Total
		Power Contractors	Min 1 of each type
		Timers	Min 1 of each type
5	Battery Charger, UPS & Battery Bank	Cards	Min 1 of each type
		Contactors	Min 2
		Diode/Thyristor	Min 1
		Indication lamp	Min 10 % of total
		Control transformer	Min 1
		MCCBs	Min 1 of each type
		Battery Cells	Min 2 nos
6	Synchronisation	Handles/Push button	Min 1 nos
7	panel	MCCBs	Min 1 of each type
		Contactors	Min 2 nos of each type
		TBs	Min 10 % of each type
		Hooter	Min 1 nos.
8	NIFPS	Cylinder	Min 1
		Indication Lamp	Min 10 % of total
		Pipes	Min 2 nos.
		Valves	Min 2 nos.
		Regulators, if any etc	Min 1 nos.
9	Fire Detection System	Fire Detectors	Min 10 % of total
		Switches	Min 10 % of Total
		Power/Signal Cable	Min 1 coil
10	E-house	Indoor Light Fittingings-Normal	Min 10% of Total
		Indoor Light Fittings-Emergency	Min 10% of Total
11	APFC	Contactor	2 nos. Of each type
		MCCBs	2 nos. of each type
		OEM recommended spares	1 nos. of each
12	33 kV Isolator	Insulator	Min 6 nos
		Contacts	Min 3 Nos.
		Moving Blades	Min 3 nos.
		Springs	Min 3 nos
		Bearings	Min 3 nos.
13	Relay		1 nos. of each type
14	Laptop		1 No.

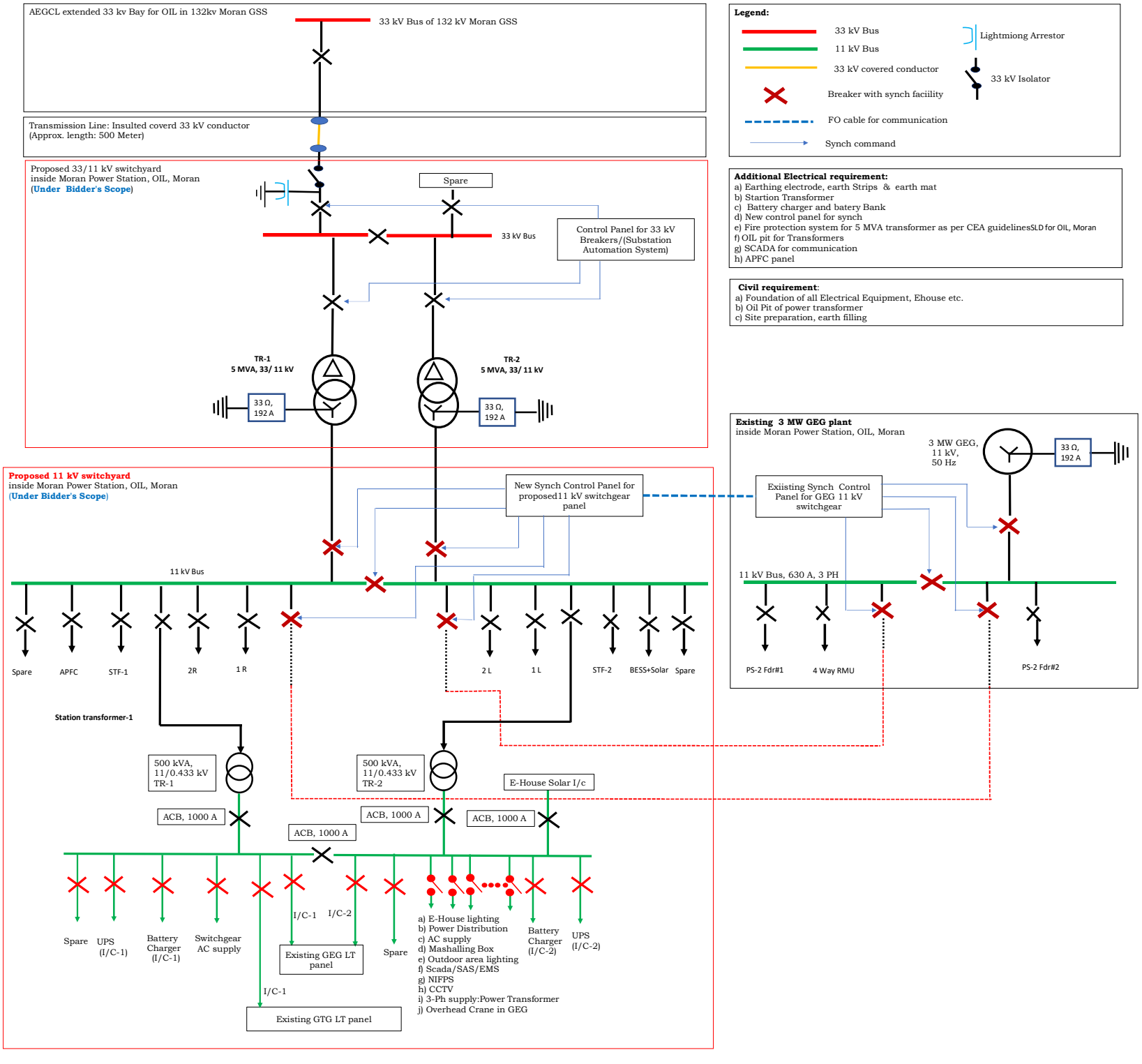
Note: a) Contractor is required to submit the spare list during detailed engineering for approval of OIL. The spare list shall include the above-mentioned items in addition to the OEM's recommended spares.

2.0 Laptop Specifications:

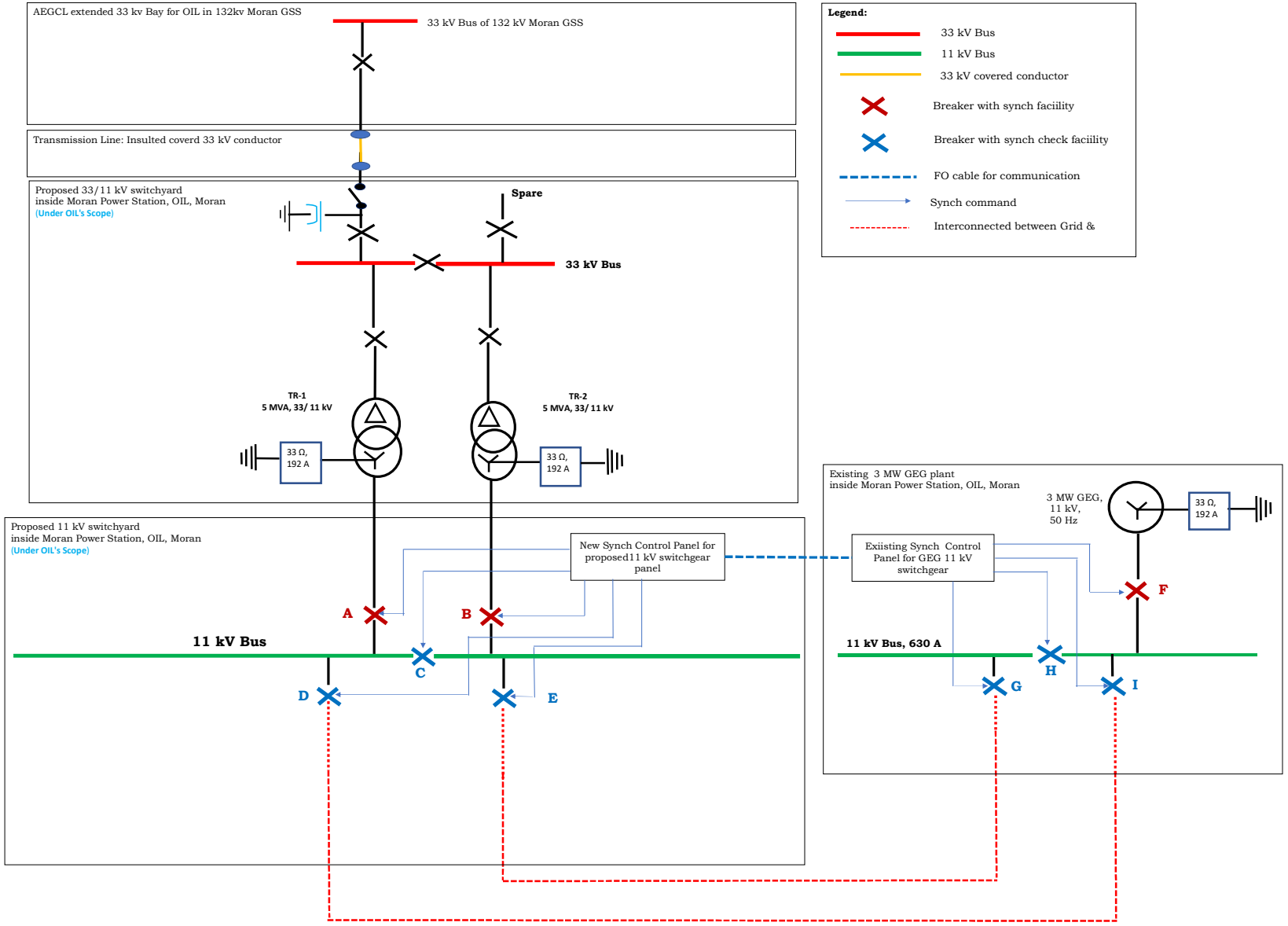
It shall include supply of one business laptop PC of Dell/Lenovo/HP/ASUS make with minimum specifications such as Intel Core i7 Gen-14 or above with 8MB Cache Processor or better, 16 GB DDR4 RAM or better expandable upto 32GB, 500 GB SSD or better,15" Anti-Glare LED Backlit display with minimum resolution 1920x1080 , minimum 2(two) USB 3.0 ports, minimum one USB –C Port, minimum one(01) HDMI port, minimum one(01) RJ 45 port,Wi-Fi connectivity, Card Reader, battery back-up of minimum 6.0 hrs complete with required cables and connectors with preloaded operating MS Window 11 professional or better with pre-loaded Adobe Acrobat Editor, Office 365 and latest version of application software required for storage, analysis and record management. Laptop will be used to retrieve data from IEDs, Power quality analyser, asset monitoring system etc..

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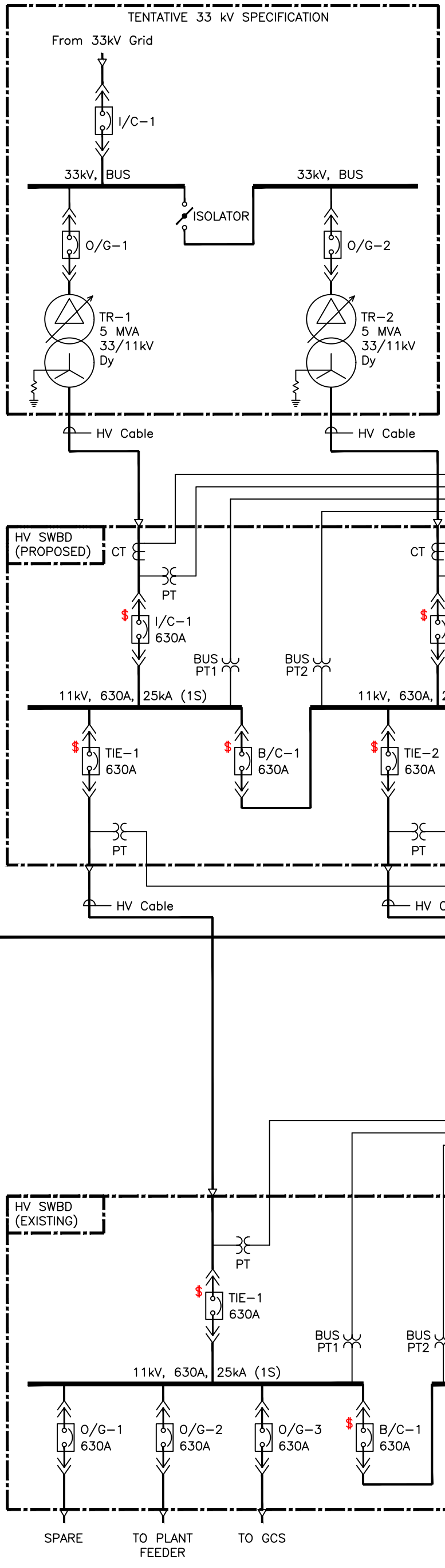
A0.1: Proposed SLD for OIL, Moran from 132 kV Moran Grid Sub-Station



Annexure: A06.1: Synchronization scheme, GEG & Grid



Note: The scheme is tentative in nature and for understanding/reference only.The scheme may change during detail enegineerings and as per requireemnt of the project.



LEGENDS:–

	CIRCUIT BREAKER		CURRENT TRANSFORMER
			POTENTIAL TRANSFORMER
	ISOLATOR		CAN TO FIBER OPTIC CONVERTER
			LIGHT INTERFACE UNIT (LIU)
	TRANSFORMER	SYNCH. RELAY	SYNCHRONISATION RELAY FOR GEG & GRID INCOMER + BUS COUPLER & INTERCONNECTR (TIE) BREAKER

NOTE:–

For grid and tie breaker synchronization, only metering CTs and PTs as shown in the SLD are required in the proposed HV switchboard. In addition, the customer shall consider standard meters and protection relays as per their requirements.

$ Synchronisation Facility (for GEG & GRID Incomer + Bus Coupler & Tie Breakers.

$ Existing Synchronising Relays to be replaced.

ONLY FOR REFERENCE

Green Power International Pvt. Ltd.
E-12/A, Sector-63, Noida – 201301 (U.P.)
Phone : (0120) 4655400, 4655444

NO.	DATE	REVISION	BY	CH	APPD
0	23.06.25	ISSUED WITH PROPOSAL	AS	RK	VKS

CLIENT: OIL INDIA LIMITED

CONSULTANT:

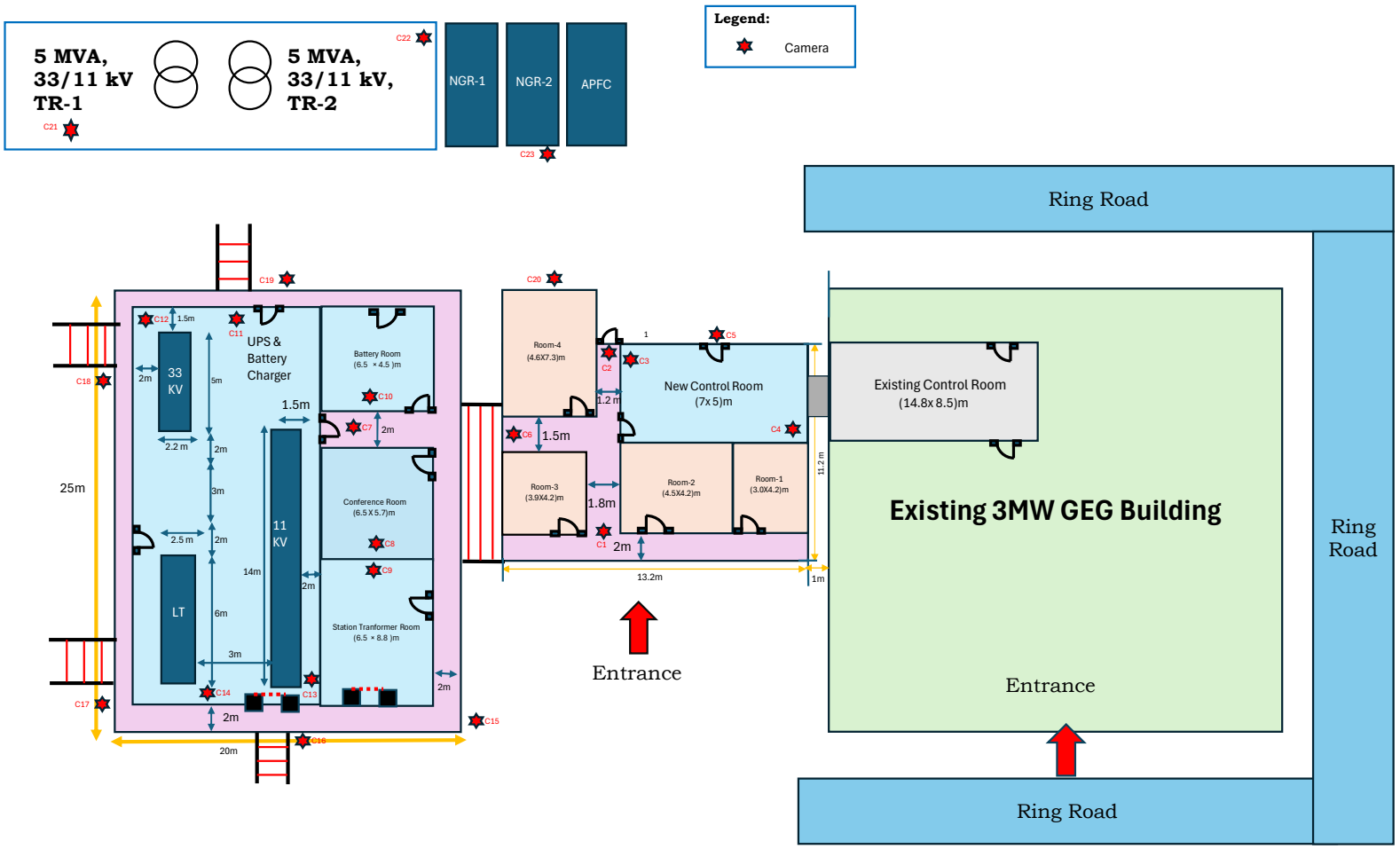
PROJECT: 1xTCG2032 V16 (11kV) MWM NATURAL GAS GENSET BASED POWER PLANT (SITE-PS-2)

TITLE: SINGLE LINE DIAGRAM (PROPOSED SCHEME FOR GRID CONNECTIVITY OF MORAN POWER STATION)

DRG.NO.: GPIPL/SALES/E-576

Rev. 0

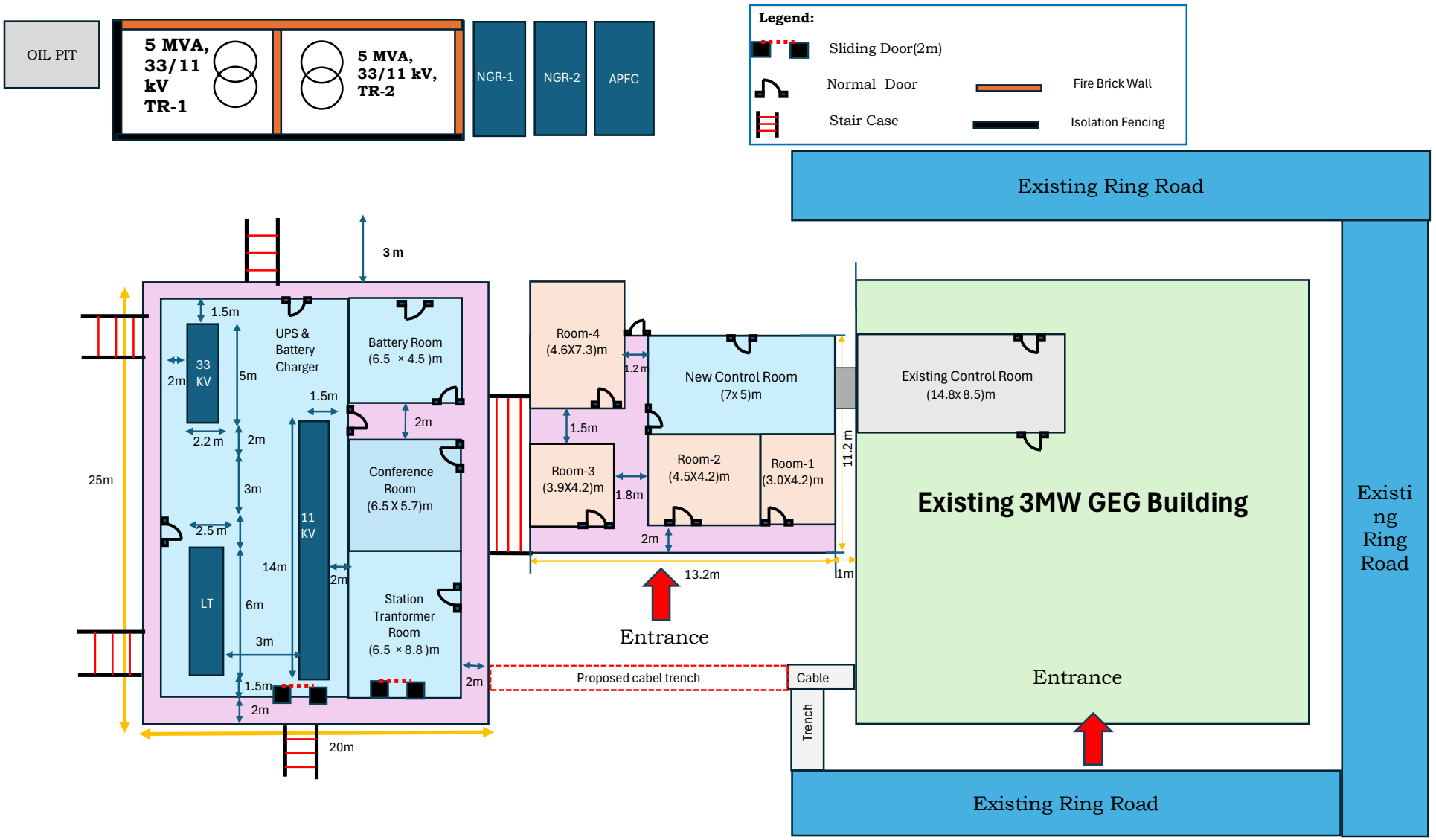
A20.1_CCTV Layout E-House(Oil, Moran)



Note: The above camera layout is tentative and provided for reference/understanding purposes only. It may be revised as per site requirements during detailed engineering. Accordingly, the actual number and locations of cameras may change during the detailed engineering stage.

Camera Type	Camera ID	Quantity
Dome Camera	C1,C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C12,C13,C14	14
Bullet Camera	C15,C16,C17,C18,C19,C20,C21,C22, C23	9

A21.1: Layout Diagram- E-House(OIL, Moran)



Note: Above diagram is tentative in nature and for understanding purpose only.

HIRING SERVICES TO CARRY OUT GEOTECHNICAL INVESTIGATION

SUB-SOIL INVESTIGATION REPORT

PROJECT

CONSTRUCTION OF MORAN POWER STATION AT MORAN

W.O NO.8132059 FOR CONTRACT NO.6117882

CLIENT

ऑयल इंडिया लिमिटेड

Oil India Limited

Civil Engineering Department

Oil India Limited Duliajan Assam

PREPARED BY

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1. INTRODUCTION

1.1 General

The soil investigation work was carried out during the month of ***October - 2025*** at proposed site for **"Construction of Moran Power Station at Moran".** Besides boring, Standard Penetration Tests at specified intervals were also performed as per I.S. specifications,undisturbed as well as disturbed samples were collected from the bore-holes for classification of soil, shear strength tests and all other relevent tests were performed to determine the safe bearing capacity of the soil.

1.2. Objective :

The objective of the **report** is restricted to the collection of factual information during the investigation period and submission of laboratory tests results,so as to sequence,extent of **soil** stratification,bearing capacity of soil,to ascertain the design parameters for the foundations from the recommended safe bearing capacity of **foundation soil**.

Test point Locations

1. Bore hole Locations

As desired ***Four (04) nos.*** of bore holes were carried out keeping in view of soil strata so as to ascertain the safe bearing capacity of soil at different depths.

Table: List of Field Test

Name of Project	Bore Hole No.	Termination Depth from GL (m)
Construction of Moran Power Station at Moran	1	20.00
	2	20.00
	3	20.00
	4	20.00

1.3 SCENARIO OF SEISMIC HAZARD IN ASSAM

INTRODUCTION:

Geomorphologically, NE India is located in an earthquake prone zone (zone-V) of the Indian subcontinent. In this region earthquake comes with landsliding flood and along series of smaller magnitude earthquakes. Here earthquakes of upto MM intensity IX can be expected. According to a hazard map by the Global Seismic Hazard Assessment Programme, the state can expect to have a peak gravitational acceleration (PGA) of 0.24g to 0.48g. The region where the highest PGA can be expected is along the state's border with Meghalaya, the site of the Great Indian earthquake of 1897.The area falls in zone-v.

EARTHQUAKE HISTORY

Much of Assam lies in the Bramaputra River Valley, except for a few southern districts. The northern and eastern parts of this valley are bounded by the Himalayan Frontal Thrust (HFF). In the eastern parts along with the HFF, there is the arc of the Lohit and Naga thrusts. Among the large earthquakes, in this region were the events in 1897 and 1950. The 1897 earthquake is well known for the dramatic accounts of violent upthrow during the shock.

SIGNIFICANT EARTHQUAKES IN ASSAM :

Both instrumented and non-instrumented events may be listed below. Reported magnitudes are listed for instrumented events while the maximum observed intensities are listed for non-instrumented shocks. Some of the latter might also have magnitudes assigned to them by various authors, in which case the reference is stated.

EARTHQUAKES DURING NON-INSTRUMENTAL PERIOD IN ASSAM 1548, 1596,1601, 1642, 1663, 1696, 1756, 1772, 1838, & 1841.

EARTHQUAKE DURING INSTRUMENTAL PERIOD IN ASSAM 1869, 1897, 1923,1930,1943, 1947, 1950, 1985, 1984 &1988.

Reported magnitudes for instrumented events are given below

SI.NO	Date	Magnitude	Epicentre
1	**10 th January 1869**	7.5	9.4 Kms North of Kumbhir (Assam)
2	**12 June 1897**	8.7	14 Kms ESE of Sangsik (Meghalaya)
3	**9th september 1923**	7.1	South Meghalaya
4	**2nd July 1930**	7.1	3.9 kms NNW of Dabigiri (Meghalaya)
5	**21 st January 1941**	6.5	Near Tezpur,Assam
6	**23 rd October 1943**	7.2	13.6 kms E of Hojai (Assam)
7	**29th July 1947**	7.7	Arunachal Pradesh
8	**15th August 1950**	8.7	20.7 kms NW of Tajobam,Arunachal Pradesh
9	**21st March 1954**	7.7	Manipur Burma border
10	**1st July 1957**	7.0	Indo Burma border
11	**31st December 1984**	6.0	SSE of Silchar
12	**6th August 1988**	7.3	Indo Burma border

The 1897 earthquake is the 2nd largest earthquake in the recorded history.The earthquake originated on a south-southwest dipping fault,named the oldham fault,bounding the North-Western section of the Shillong Plateau.During the event,the total slip on this fault,amounted to 16 m. which is among the greatest for any known earthquake.The towns of Dhubri,Goalpara,Guwahati and kuch Bihar in Assam and West Bengal was heavily damaged.At Guwahati is located in an earthquake prone zone(zone v as per IS:1893-2002),the earth subsided along the Brahmaputra and several sand vents were formed.The Brahmaputra is also reported to have risen by several mtrs. and even reversed its flow during the shock. The earthquake 15th August 1950 was the 6th largest earthquake of the recorded history.
Though it hit in a mountainous region along India's international border with China, 1500 people were killed and the drainage of the region was greatly affected. The resultant floods were the cause of most of the fatalities aftermath of this earthquake. The initial shock was followed by thousands of aftershocks, some of which were big earthquakes enough to be reckoned. It had a magnitude of 8.7 and struck a relatively sparsely populated region along the Indo-China border. This earthquake is often referred to as the “Assam Earthqake of 1950”.It was also felt throughout Bangladesh, Bhutan and Myanmar. Damage occurred in the entire region as far as Kolkata. It was felt across a wide area of the subcontinent, over an area totalling 4.5 million

1.4 Planning And Soil Exploration :

On the basis of nature of work it was decided to carry out **soil** exploration in order to :

a) Obtain **soil** samples, both representative disturbed and undisturbed wherever necessary for classification and other laboratory tests for determining engineering properties of **soil** strata.

b) Obtain soundings of penetration resistance by standard Penetration test in the bore holes.

1.5 Design criteria For Footings :

i) Footing must be safe against **shear failure** of supporting **soil**.

ii) Footing must not settle more than **permissible limit of settlement.**

Net safe bearing capacity 'qns' is obtained by using the S.P.T value of **foundation** & the relevant shear parameters of **soil**. Factor of safety of 2.5 is applied on ultimate bearing capacity as recommended by B.I.S. Net loading intensity 'qns' is obtained by using physical characteristics of **foundation** & relevant compressibility characteristics of the underlying **soil** . The settlement so obtained shall be with in permissible limits as **per** BIS recommendations.

The computed values i.e. **'qns' as the allowable bearing capacity for designing foundations of structure** is adopted after settlement criteria is satisfied or within the permissible limit .

1.6 Sub soil water level

The sub soil water level is encountered at various bore holes as shown in Bore Hole logs.

2. DETAILS OF FIELD WORK

2.1 Boring operation & Sampling :

150 mm dia hole was advanced at the location Using shell and auger/Drilling method.

150 mm nominal dia flush steel casing was advanced with the boring and the full length of the bore hole was encased at each location.

2.2 Disturbed and Undisturbed Sample :

Disturbed and undisturbed **soil** samples were obtained depending upon the nature of **soil** from different depths in the bore hole. The undisturbed samples were collected in sampling tubes. The ends of the tubes are sealed with molten wax to prevent evaporation. These samples were subsequently tested in the laboratory so as to determine the various index and engineering properties of various sub **soil** strata met in the bore holes.

2.3 Standard Penetration Test

Standard Penetration test was performed in the boreholes. The standard split spoon sampler, attached to a string of drill rod was lowered to the bottom of the hole and allowed to rest under self weight. The drill rod was connected to driving assembly which consisted of a hoisting equipments, a drive weight (Hammer) of 65 Kg, and a guide to ensure a 75 cm free fall of hammer on an anvil. The number of hammer blows that were required to penetrate the sampler through three runs of 150 mm each were recorded. Initial driving of 150 mm was disregarded and the number of blows required to drive the sampler through the remaining 300 mm is called BLOW COUNT or PENETRATION NUMBER,N. At the end of the test, the sampler was withdrawn and the **soil** extracted for subsequent **testing** in the laboratory . If the penetration was less than 30 cm for 100 blows, it is considered as refusal and the actual penetration was recorded.

Correction of 'N' value :

In case of Sandy **soil** & Non plastic silts, the observed SPT values, designated as 'N', are to be corrected to account for the following two effects.

(i) Correct to account for the effect of overburden pressure.

N' = Cn x N

Cn' is overburden pressure correction and is calculated from the figure No. 1 given on page No. 8 in IS : 2131-1981.

(ii) Correction due to submergence Correction.

N" = 15 + (N'-15)/2 provided N' is >15 where 'N" is the final corrected value where ever both the overburden and submergence corrections are necessary the overburden correction is applied first correction of N values of Bore Hole.

3.0 LABORATORY TESTS :

3.1 Index Properties

All the relevant classification on the samples obtained from the bore holes were carried out in the laboratory. The index properties obtained from such classification tests at different depths in the bore holes are reported.

3.2 DISTURBED SOIL SAMPLES:

Disturbed **soil** sample collected in field have been tested in laboratory and preparation of sample for the under mentioned tests have been done in accordance with I.S.2720-(Part-I)-1983.

1. Sieve analysis test as **per** I.S. Specification No. 2720 --(Part-IV).
2. Atterburg limit test (L.L. & P.I.) as **per** I.S. Specification No. 2720 --(Part-II).
3. Natural moisture content as **per** I.S.Specification No.2720 – (Part-IV).
4. Particle size analysis test as **per** I.S.Specification No. 2720-(Part-VI).
5. Wet density test as **per** I.S.Specification No 2720- (Part-VI).
6. Dry density test as **per** I.S.Specification No. 2720- (Part-VI)
7. Specific Gravity test as **per** I.S.Specification No-2720-(Part-III)-Sec.2.

3.3 UNDISTURBED SOIL SAMPLES:

Undisturbed **Soil** samples have been prepared in accordance with I.S. Specification No. 2720-(Part-I)- 1983 and tested as follows:-

1. Sieve analysis test as **per** I.S. Specification No. 2720 --(Part-IV).
2. Atterburg limit test (L.L. & P.I.) as **per** I.S. Specification No. 2720 --(Part-II).
3. Natural moisture content as **per** I.S.Specification No.2720 – (Part-IV).
4. Particle size analysis test as **per** I.S.Specification No. 2720-(Part-VI).
5. Wet density test as **per** I.S.Specification No 2720- (Part-VI).
6. Dry density test as **per** I.S.Specification No. 2720- (Part-VI)
7. Specific Gravity test as **per** I.S.Specification No-2720-(Part-III)-Sec.2.
8. Triaxial compression test and determination of shear parameter

   (C & Ø as **per** I.S. XII) & I.S. 2720 – (part – XIII).
9. Consolidation test conducted as **per** I.S Specification No. 2720-(Part-XV).

Calculation of bearing capacity is governed generally by I.S. Specification No . 8009-)Part-I)-1976, I.S.No.2720- (Part – II)- 1980, I.S. No 6403-1981, I.S. 1904-1978 and I.S. 1080-1985 and other relevant I.S. Codes as well as based on assessment and latest developments.

DELETERIOUS CHEMICALS:

The nature of strata was fairly identical through the site therefore one representative **soil** sample from the site was prepared & tested for deleterious chemicals which may effective the concrete & reinforcement the results are given below :

CHEMICAL ANALYSIS OF SOIL:

SL.No.	Particulars	Sample -01	Sample -02	Sample -03	Sample -04
1	pH	6.66	6.39	6.53	6.46
2	Cation Exchange Capcity (meq/100 gm)	23.52	25.17	23.76	23.28
3	Total Sulphate (%)	0.48	0.47	0.48	0.48
4	Calcium Carbonate (%)	0.83	0.81	0.84	0.82
5	Silica (%)	59.63	58.44	60.23	59.03
6	Sesquioxides (%)	1.47	1.44	1.48	1.46
7	Silica : sesquioxide ratio	55.03	53.93	55.58	54.48
8	Chloride (%)	0.179	0.175	0.181	0.177

CHEMICAL ANALYSIS OF SUB-SOIL WATER:

Sample No.	P^H Value	Chlorides (as Cl) (mg/lit)	Sulphate (as SO4) (mg/lit)	Other organic Content (mg/lit)
1	6.63	61.23	58.74	35.88
2	6.65	60.34	57.89	36.97
3	6.55	61.65	59.15	38.83
4	6.65	62.36	59.83	38.35

Above results show that the strata is quite safe for concrete & reinforcement for the site.

The chloride content in percentage in the soil is 0.177 to 0.181, hence PPC cement should be used.

4.0 INTERPRETATION OF TEST RESULTS:

The exact choice of type of **foundation** shall depend on the relative economics and practical considerations.

The allowable bearing pressure for the **foundation** shall be governed by I.S.6403-1981 "code of practice for determination of allowable bearing pressure of shallow **foundation**" for shear consideration and governed by I.S 1904-1978"code of practice for structural safety of building.Shallow **foundation** for settlement considerations has been calculated in accordance with I.S.8009-(Part-I & II) – 1976.

5.0 FOUNDATION PARAMETERS.

Allowable Bearing capacity values are based on the following parameters :

A) Size & Depth of Footing

a) Depth of footings (D_f) = 2.0m, 2.5m, 3.0m, 3.5m & 4.0m

b) Size of footings (B) = 2.0m x 2.0m, 3.0m x 3.0m, 4.0m x 4.0m

6.0 ALLOWABLE BEARING CAPACITY CRITERIA

Foundation can fail by two modes i.e.

i) Shear failure.

ii) Excessive settlement.

Shear failure being catastrophic, an adequate factor of safety is applied to ultimate bearing capacity that can initiate this type of failure. BIS recommends a value of FOS = 2.5 to obtain the net safe bearing capacity qns by using the physical characteristics of the **foundation** and relevant shear strength parameters of **soil**. Through Settlement analysis a net loading intensity qn is obtained by using the physical characteristics of the foundation and the relevant compressibility characteristics of the Underlying soil. The value so obtained ensures that the foundation shall not settle more than that which is permissible as per BIS recommendations. The permissible settlement depends upon the type of superstructure and the nature of supporting strata.

STANDARD PENETRATION TEST

The field S.P.T is corrected for both Over burden pressure and for dilatancy (As per IS:2131-1982)

Depth (m)	Bore Hole No.01		Bore Hole No.02		Bore Hole No.03		Bore Hole No.04	
	Observed N-value	Corrected N-value	Observed N-value	Corrected N-value	Observed N-value	Corrected N-value	Observed N-value	Corrected N-value
1.5	1	1	1	1	2	2	1	1
3.0	9	9	11	11	9	9	9	9
4.5	15	17	20	20	13	15	15	17
6.0	22	20	25	22	23	21	20	19
7.5	36	27	32	25	35	26	25	21
9.0	29	22	36	26	44	30	45	31
10.5	43	29	43	29	45	30	47	31
12.0	47	30	46	29	47	30	53	33
13.5	51	31	45	28	60	35	54	32
15.0	71	39	67	37	64	36	65	36
16.5	67	36	74	39	79	41	70	37
18.0	72	37	75	38	82	41	72	37
19.5	76	38	87	42	85	41	81	40

7.0 COMPUTATION OF ALLOWABLE BEARING CAPACITY

Based on Standard Penetration Resistance value

q_{ns} = $((q (N_q-1) s_q d_q i_q + 0.5 B \gamma N_\gamma s_\gamma d_\gamma i_\gamma W') / F) \times 10$ t / m^2

Where

N_q, N_γ = Bearing capacity factors

s_q, s_γ = Shape factors

For square footing s_q = 1.2 s_γ = 0.80

B = Width dia of foundation in cm

$d_q = d_\gamma$ = Depth factors = 1.00 for $\phi < 10^0$

= 1 + 0.1 (D_f / B) x sqrt (N_ϕ) for $\phi > 10^0$

ϕ = Angle of shearing resistance of soil in degrees

N_ϕ = $\tan^2 (45^0 + \phi / 2)$

D_f = Depth of foundation in cm

N_ϕ = $\tan^2 (45^0 + \phi / 2)$ = 1.0

i_q = Inclination factors = $(1- (\alpha / 90))^2$

i_γ = Inclination factor = $(1- (\alpha / \phi))^2$

α = Inclination of the load to the vertical in degrees

q = Effective surcharge at the base level of foundation in kgf / cm^2

γ = Bulk unit weight of foundation soil in kgf / cm^3

W' = Water table correction factor

F = Factor of safety

For BH.NO - 01

B = 200 cm

At depth D_f = 250 cm

Corrected N-value = (1 + 9 + 17)/3 = 9.00 Say N = 9.0

For N = 9.00 ϕ = 29.81 ^{o} ϕ_{cor} = 23.31 ^{o} Say 23 ^{o}

For ϕ = 23 ^{o} N_q = 8.66 N_γ = 8.20

s_q = 1.20 s_γ = 0.80

$d_q=d_\gamma$ = 1 + 0.1(250 / 200) x tan (45 + 23 / 2) = 1.19

α = 0 ^{o} $i_q=i_\gamma$ = 1.00

γ = 0.002 kgf / cm^2

γ' = 0.001 kgf / cm^2 q = 0.001 x 250 = 0.250 kgf / cm^2

W' = 0.50

F = 2.5

q_s = ((0.250 x (8.66 - 1) x 1.20 x 1.19 x 1.00 + 0.50 x 200 x 0.002 x 8.20 x 0.8 x 1.19 x 1.00 x 0.5) / 2.5) x 10

= 14.06 t / m^2

BASED ON SHEAR (C-Ø) VALUE :

For bearing capacity the following formula has been adopted as per I.S: 6403 - 1981.

q_{ns} = $((2/3\ c\ N_c\ s_c\ d_c\ i_c + q\ (N_q-1)\ s_q\ d_q\ i_q + 0.5\ B\ \gamma\ N_\gamma\ s_\gamma\ d_\gamma\ i_\gamma\ W') / F) \times 10\ t / m^2$

Where c = Cohesion in kgf / cm^2

N_c, N_q, N_γ = Bearing capacity factors

S_c, S_q, S_γ = Shape factors

CALCULATION OF ALLOWABLE BEARING CAPACITY OF SHALLOW FOUNDATION

B = 200 cm

For Borehole No. 01

At depth D_f = 250 cm

ϕ = 18.48 ^{o} ϕ_{cor} = 12.62 ^{o} Say 12 ^{o} C = 0.20

For ϕ = 12 ^{o} N_q = 2.97 N_γ = 1.69 N_c = 9.26

s_q = 1.20 s_γ = 0.80

$d_q = d_\gamma$ = 1 + 0.1(250 / 200) x tan (45 + 12 / 2) = 1.15

s_c = 1.30

d_c = 1 + 0.2 (250 / 200) x tan (45+12/2) = 1.31

α = 0 ^{o} $i_q = i_\gamma$ = 1.00 = i_c

γ = 0.002 kgf / cm^3

γ' = 0.001 kgf / cm^3 q = 0.001 x 250 = 0.250 kgf / cm^2

W' = 0.50

F = 2.5

q_s = {2/3 x 0.20 X 9.26 X 1.30 X 1.31 X 1.00 + 0.250 x (2.97 - 1) x 1.20 x 1.15 x 1.00 + 0.50 x 200 x 0.002 x 1.69 x 0.8 x 1.15 x 1.00 x 0.5}/ 2.5 x 10

= 11.75 t/m^2 =

NET SAFE BEARING CAPACITY (t/m^2) AT VARIOUS DEPTHS			
Bore Hole No.	FOOTING SIZE - 2.0 m x 2.0 m		
	Depth (m)	From N- value	From C-Ø value
1	2.0	11.48	10.76
	2.5	14.06	11.75
	3.0	16.80	13.08
	3.5	19.52	15.23
	4.0	22.53	17.59
	FOOTING SIZE - 3.0 m x 3.0 m		
	2.0	12.42	10.38
	2.5	14.84	11.27
	3.0	17.21	13.48
	3.5	19.83	15.41
	4.0	22.37	17.41
	FOOTING SIZE - 4.0 m x 4.0 m		
	2.0	13.61	10.35
	2.5	15.74	11.11
	3.0	18.07	14.11
	3.5	20.47	16.01
	4.0	22.95	17.96
Bore Hole No.	FOOTING SIZE - 2.0 m x 2.0 m		
	Depth (m)	From N- value	From C-Ø value
2	2.0	11.48	10.80
	2.5	14.06	11.88
	3.0	16.80	13.08
	3.5	19.52	15.23
	4.0	22.53	17.59
	FOOTING SIZE - 3.0 m x 3.0 m		
	2.0	12.42	10.51
	2.5	14.84	11.42
	3.0	17.21	13.48
	3.5	19.83	15.41
	4.0	22.37	17.41
	FOOTING SIZE - 4.0 m x 4.0 m		
	2.0	13.61	10.54
	2.5	15.74	11.38
	3.0	18.07	14.11
	3.5	20.47	16.01
	4.0	22.95	17.96

NET SAFE BEARING CAPACITY (t/m^2) AT VARIOUS DEPTHS			
Bore Hole No.	FOOTING SIZE - 2.0 m x 2.0 m		
	Depth (m)	From N- value	From C-Ø value
3	2.0	10.15	11.22
	2.5	12.46	12.32
	3.0	14.76	13.08
	3.5	17.31	15.23
	4.0	19.99	17.59
	FOOTING SIZE - 3.0 m x 3.0 m		
	2.0	10.97	10.91
	2.5	13.00	11.82
	3.0	15.23	13.48
	3.5	17.41	15.41
	4.0	19.82	17.41
	FOOTING SIZE - 4.0 m x 4.0 m		
	2.0	11.89	10.92
	2.5	13.90	11.77
	3.0	15.97	14.11
	3.5	18.10	16.01
	4.0	20.31	17.96
Bore Hole No.	FOOTING SIZE - 2.0 m x 2.0 m		
	Depth (m)	From N- value	From C-Ø value
4	2.0	10.15	11.35
	2.5	12.46	12.54
	3.0	14.76	14.76
	3.5	17.31	17.31
	4.0	19.99	19.99
	FOOTING SIZE - 3.0 m x 3.0 m		
	2.0	10.97	11.07
	2.5	13.00	12.08
	3.0	15.23	15.23
	3.5	17.41	17.41
	4.0	19.82	19.82
	FOOTING SIZE - 4.0 m x 4.0 m		
	2.0	11.89	11.11
	2.5	13.90	12.04
	3.0	15.97	15.97
	3.5	18.10	18.10
	4.0	20.31	20.31

PILE LOAD CAPACITY

The safe load carrying capacity of a bored cast in-situ concrete pile passing through clayey soil layer and resting on granular soil has been worked out by using the following formular as per IS: 2911 (Part I/Sec 2) - 2010

$$Q_s = ((Ap(0.5\ D\ \gamma\ N_\gamma + P_D\ N_q) + \Sigma^n_{i=1} k\ P_{Di}\ \tan\delta\ A_{si} + \Sigma^n_{i=1}\ \alpha_i\ C_i\ A_{si}) / F) / 1000\ t$$

Where

A_p = Cross sectional area of pile stem at toe level in cm^2

D = Stem diameter in cm

γ = Effective unit weight of soil at pile toe in kgf / cm^3

P_D = Effective overburden pressure at pile toe in kgf / cm^2

$N\gamma$ & N_q = Bearing capacity factors depending upon the angle of internal friction f at toe

α = Reduction factor

C' = Average cohesion of the soil along the pile stem in kgf / cm^2

A_s = Surface area of the stem in cm^2

F = Factor of safety

The safe load carrying capacity of concrete bored cast in-situ piles (Qs) in cohesive soil has been calculated out using the following formula as per IS: 2911 (Part I/Sec2) - 2010

$$Qs = (A_p\ N_c\ C_p + \Sigma^n_{i=1}\ \alpha_i\ C_i\ As_i) / F$$

Where

Ap = cross sectional area of pile toe in cm^2

Nc = bearing capacity factor

Cp = average cohesion at pile tip in kg / cm^2

α = reduction factor

C' = average cohesion throughout the length of pile in kg / cm^2

As = surface area of pile shaft in cm^2

F = factor of safety

PILE LOAD CAPACITY CALCULATION

For Borehole No. 01

Length of pile = 1000 cm

D = 45 cm

Effective pile length for overburden pressure = 20 x 45 = 900 cm

γ = 0.001 kgf/cm^3

P_D = 0.90 kgf / cm^2

ϕ = 29.57 ^{o}

N_γ = 21.03

N_q = 21.0

Ap = (3.1415 / 4) x 45^2 = 1,590.43 cm^2

$\alpha_{i=1}$ = 1.0 $C_{i=1}$ = 0.200 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 4241.15 kgf / cm^2		
δ = 18.50 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 4789.36		**Layer = 0.0-1.5 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.13 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 7977.94		**Layer = 1.5-3.0 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.30 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 8033.43		**Layer = 3.0-4.5 m**

$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.44	^{o}			**Layer = 4.5-6.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8079.27				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.50	^{o}			**Layer = 6.0-7.5 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8098.95				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.53	^{o}			**Layer = 7.5-9.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8108.81				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.57	^{o}			**Layer = 9.0-10.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	100.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	14,137.17	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	5414.63				

$\Sigma^n_{i=1} \alpha_i C_i A_{si}$ = 4241.15 kgf

$\Sigma^n_{i=1} K P_{Di} \tan\delta A_{si}$ = 50502.39 kgf

F = 2.5

Qs = ((1,590.43 x (0.5 x 45 x 0.001 x 21.03 + 0.9 x 21) + 4,241.15 + 50502.3873060643) / 2.5) / 1000

= 34.22 ton

PILE LOAD CAPACITY CALCULATION

For Borehole No. 02

Length of pile = 1000 cm

D = 45 cm

Effective pile length for overburden pressure = 20 x 45 = 900 cm

γ = 0.001 kgf/cm^3

P_D = 0.90 kgf / cm^2

ϕ = 29.40 ^{o}

N_γ = 20.51

N_q = 20.0

Ap = (3.1415 / 4) x 45^2 = 1,590.43 cm^2

$\alpha_{i=1}$ = 1.0 $C_{i=1}$ = 0.180 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 3817.04 kgf / cm^2		
δ = 20.09 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 5234.50		**Layer = 0.0-1.5 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.15 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 7983.37		**Layer = 1.5-3.0 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.17 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 7989.93		**Layer = 3.0-4.5 m**

$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.22	^{o}			**Layer = 4.5-6.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8006.32				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.28	^{o}			**Layer = 6.0-7.5 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8026.01				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.33	^{o}			**Layer = 7.5-9.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8041.95				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	29.40	^{o}			**Layer = 9.0-10.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	100.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	14,137.17	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	5377.10				

$\Sigma^n_{i=1} \alpha_i C_i A_{si}$ = 3817.04 kgf

$\Sigma^n_{i=1} K P_{Di} \tan\delta A_{si}$ = 50659.18 kgf

F = 2.5

Qs = ((1,590.43 x (0.5 x 45 x 0.001 x 20.51 + 0.9 x 20) + 3,817.04 + 50659.1799266661) / 2.5) / 1000

= 33.54 ton

PILE LOAD CAPACITY CALCULATION

For Borehole No. 03

Length of pile = 1000 cm

D = 50 cm

Effective pile length for overburden pressure = 20 x 50 = 1000 cm

γ = 0.001 kgf/cm^3

P_D = 1.00 kgf / cm^2

ϕ = 29.66 ^{o}

N_γ = 21.30

N_q = 21.0

Ap = (3.1415 / 4) x 50^2 = 1,963.50 cm^2

$\alpha_{i=1}$ = 1.0 $C_{i=1}$ = 0.190 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 23,561.94 cm^2 $\alpha_1 C_1 As_1$ = 4476.77 kgf / cm^2		
δ = 20.33 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 750.00 cm P_{Di} = 0.7500 kgf/cm^2 A_{si} = 23,561.94 cm^2 $KP_{Di} \tan\delta A_{si}$ = 6546.18		**Layer = 0.0-1.5 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 23,561.94 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.11 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 750.00 cm P_{Di} = 0.7500 kgf/cm^2 A_{si} = 23,561.94 cm^2 $KP_{Di} \tan\delta A_{si}$ = 9840.03		**Layer = 1.5-3.0 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 23,561.94 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.26 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 750.00 cm P_{Di} = 0.7500 kgf/cm^2 A_{si} = 23,561.94 cm^2 $KP_{Di} \tan\delta A_{si}$ = 9900.54		**Layer = 3.0-4.5 m**

$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 23,561.94 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.31 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 750.00 cm P_{Di} = 0.7500 kgf/cm^2 A_{si} = 23,561.94 cm^2 $KP_{Di} \tan\delta A_{si}$ = 9920.75	**Layer = 4.5-6.0 m**	
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 23,561.94 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.37 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 750.00 cm P_{Di} = 0.7500 kgf/cm^2 A_{si} = 23,561.94 cm^2 $KP_{Di} \tan\delta A_{si}$ = 9944.43	**Layer = 6.0-7.5 m**	
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 23,561.94 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.59 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 750.00 cm P_{Di} = 0.7500 kgf/cm^2 A_{si} = 23,561.94 cm^2 $KP_{Di} \tan\delta A_{si}$ = 10033.11	**Layer = 7.5-9.0 m**	
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 23,561.94 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.66 ^{o} K = 1.00 n = 1 **Layer No.** tn = 100.00 cm **layer thickness** D_i = 750.00 cm P_{Di} = 0.7500 kgf/cm^2 A_{si} = 15,707.96 cm^2 $KP_{Di} \tan\delta A_{si}$ = 6708.52	**Layer = 9.0-10.0 m**	

$\Sigma^n_{i=1} \alpha_i C_i A_{si}$ = 4476.77 kgf

$\Sigma^n_{i=1} K P_{Di} \tan\delta A_{si}$ = 62893.56 kgf

F = 2.5

Qs = ((1,963.50 x (0.5 x 50 x 0.001 x 21.30 + 1 x 21) + 4,476.77 + 62893.5571302084) / 2.5) / 1000

= 43.86 ton

PILE LOAD CAPACITY CALCULATION

For Borehole No. 04

Length of pile = 1000 cm

D = 45 cm

Effective pile length for overburden pressure = 20 x 45 = 900 cm

γ = 0.001 kgf/cm^3

P_D = 0.90 kgf / cm^2

ϕ = 31.29 ^{o}

N_γ = 27.17

N_q = 26.0

Ap = (3.1415 / 4) x 45^2 = 1,590.43 cm^2

$\alpha_{i=1}$ = 1.0 $C_{i=1}$ = 0.170 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 3604.98 kgf / cm^2		
δ = 21.26 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 5569.12		**Layer = 0.0-1.5 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.33 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 8042.43		**Layer = 1.5-3.0 m**
$\alpha_{i=1}$ = 0.5 $C_{i=1}$ = 0.000 kgf / cm^2 Pile shaft length = 150 cm **For layer i =1** $A_{si=1}$ = 21,205.75 cm^2 $\alpha_1 C_1 As_1$ = 0.00 kgf / cm^2		
δ = 29.68 ^{o} K = 1.00 n = 1 **Layer No.** tn = 150.00 cm **layer thickness** D_i = 675.00 cm P_{Di} = 0.6750 kgf/cm^2 A_{si} = 21,205.75 cm^2 $KP_{Di} \tan\delta A_{si}$ = 8157.87		**Layer = 3.0-4.5 m**

$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	30.93	^{o}			**Layer = 4.5-6.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8575.63				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	30.99	^{o}			**Layer = 6.0-7.5 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8596.54				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	31.22	^{o}			**Layer = 7.5-9.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	150.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	21,205.75	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	8674.89				
$\alpha_{i=1}$	=	0.5				
$C_{i=1}$	=	0.000	kgf / cm^2			
Pile shaft length			=	150	cm	**For layer i =1**
$A_{si=1}$	=	21,205.75	cm^2			
$\alpha_1 C_1 As_1$	=	0.00	kgf / cm^2			
δ	=	31.29	^{o}			**Layer = 9.0-10.0 m**
K	=	1.00				
n	=	1		**Layer No.**		
tn	=	100.00	cm	**layer thickness**		
D_i	=	675.00	cm			
P_{Di}	=	0.6750	kgf/cm^2			
A_{si}	=	14,137.17	cm^2			
$KP_{Di} \tan\delta A_{si}$	=	5800.74				

$\Sigma^{n}_{i=1} \alpha_i C_i A_{si}$ = 3604.98 kgf

$\Sigma^{n}_{i=1} K P_{Di} \tan\delta A_{si}$ = 53417.22 kgf

F = 2.5

Qs = ((1,590.43 x (0.5 x 45 x 0.001 x 27.17 + 0.9 x 26) + 3,604.98 + 53417.2150714716) / 2.5) / 1000

= 38.08 ton

LATERAL PILE LOAD CAPACITY

The lateral capacity of Pile can be determined as per IS 2911(Part 1/sec 2 -2010)

$Q = (12 \times E \times I \times Y)/(L_1 + L_f)^3$

Where,

Q = Lateral load for the pile

E = Young's modulus of pile material in Kg/cm^2

I = Moment of inertia of pile cross section in Cm^4

D = Dia. Of pile in cm

L_1 = Pile length above Ground level in cm

L_f = Depth of fixity of Pile in cm

y = Permissible deflection, $QL_f^3/12EI$ =5 mm =0.5 cm

$Q = 6EI/L_f^3$

Stifness factor for pile in sand

$T = (EI/\eta_h)^{1/5}$

BH NO.	LENGTH (M)	DIA. (cm)	E	I	η_h (kg/cm^3)	T	L_1	L/T	L_f/T	L_f	Q (Kg)
1	10.00	45	273861	201288.96	0.59	156.56	0.0	0.0	2.2	344.4217	8095.253
2	10.00	45	273861	201288.96	0.59	156.56	0.0	0.0	2.2	344.4217	8095.253
3	10.00	45	273861	201288.96	0.61	155.43	0.0	0.0	2.2	341.9448	8272.441
4	10.00	45	273861	201288.96	0.63	154.35	0.0	0.0	2.2	339.5712	8447.135

UPLIFT CAPACITY OF PILE (IS 2911-Part 1/sec 1 -2010)

$Q_u = W + Q_s$

Where,

Q_s,Frictional resistance of the pile along the length = $\Sigma^{n}_{i=1}\alpha_i c_i A_{si} + \Sigma^{n}_{i=1} K P_{Di} \tan\delta A_{si}$

W = weight of the pile

unit weight of RCC = 2500 kg/m^3

W	=	3976.08 kg	Dia of Pile =	450	mm
Qs	=	54743.54 kg	Length of pile =	10.0	m
F.O.S	=	2.5			
Q_u	=	58719.616 kg			
	=	58.720 ton			
$Q_{u(factored)}$	=	23.49 ton	***(Reffer to BH-01)***		

BH	Length (m)	Dia.	W	F.O.S	Q_s (kg)	Q_u (ton)	$Q_{u(factored)}$ (ton)
1	10.0	450	3976.08	2.5	54743.54	58.72	23.49
2	10.0	450	3976.08	2.5	54476.21	58.45	23.38
3	10.0	450	3976.08	2.5	67370.33	71.35	28.54
4	10.0	450	3976.08	2.5	57022.19	61.00	24.40

Table : Pile Load Capacity

Type of Pile	B.H No.	Length of Pile (m)	Cut-off level of Pile From GL (m)	Dia. Of Pile (mm)	Pile Load Capacity (ton)		
					Axial	Lateral	Uplift
Bored Cast-in-situ R.C.C Concrete Pile	1	10.0	1.0	450	34.22	8.10	23.49
	2	10.0	1.0	450	33.54	8.10	23.38
	3	10.0	1.0	450	43.86	8.27	28.54
	4	10.0	1.0	450	38.08	8.45	24.40

However,the theoretical load carrying capacity of pile is to be verified by conducting load test on pile.

Note:

i) The recommended pile load capacity is considered as lower value as only single bore hole is sinked in the pile group location it may be possible of encounter of loose sand layer.So from the structural safety point of view it is recommended to adopt lower value of pile load capacity.

ii) Contractor shall establish the pile capacities at site by conducting initial pile load tests on tests piles before commencement of pilling works as per IS:2911 Part-IV.Routine pile load test shall be conducted on job piles as per IS:2911 Part-IV.

iii) The concrete shall have a minimum strength of 35 N/mm^2 at 28 days.Ordinary Portland cement/Portland slag cement/Portland Pozzolana cement may be used.The cement content for concrete shall not be less than 400 kg/m^3 with maximum water cement ratio 0.45.Reiforcement steel shall be high strength deformed bar of grade Fe 500 conforming to IS:1786.

iv) Pile shall be designed as per the actual pile head force.

SUMMARY & RECOMMENDATION :

From field and laboratory investigations and analysis the following recommendation had been made for the purpose of design of foundation which is safe against shear as well as settlement criteria.

(A) Type of Foundation - Shallow foundation

Bearing capacities as given in the table below may be adopted for the design of foundation of the structures as per **I.S: 6403 - 1981.**

TABLE : BEARING CAPACITY

Name of Site	Type of Foundation	Size of Foundation	Depth of Foundation (m)	Recommended Net SBC (t/m^2)
Construction of Moran Power Station at Moran	Shallow Foundation	2.0 m x 2.0 m	2.0	10.0
			2.5	11.0
			3.0	13.0
			3.5	15.0
			4.0	17.0
	Shallow Foundation	3.0 m x 3.0 m	2.0	10.0
			2.5	11.0
			3.0	13.0
			3.5	15.0
			4.0	17.0
	Shallow Foundation	4.0 m x 4.0 m	2.0	10.0
			2.5	11.0
			3.0	14.0
			3.5	16.0
			4.0	17.0

(B) For Heavily Loaded Structures (Reffer to IS: 2911 (Part I/Sec 2) - 1979):

Type of Pile	Length of Pile (m)	Cut-off level of Pile From GL (m)	Diameter Of Pile (mm)	Pile Load Capacity (ton)		
				Axial	Lateral	Uplift
Bored Cast-in-situ R.C.C Concrete Pile	10.0	1.0	450	33.00	8.00	23.00

Type of Boring : Shell/Auger	Bore Hole NO.01	Date Started :08.10.2025 Date Completed :08.10.2025

DESCRIPTION OF STRATA	DEPTH (m)	STRATA	SAMPLE COLLECTED D/S	SAMPLE COLLECTED U/S	GROUND WATER LEVEL	Depth - N-value curve (10 20 30 40)	N - VALUE
Silty clay brown to grey in colour	1.0		1.5				1
	2.0			2.0			
	3.0		3.0				9
	4.0						
	4.5						15
	5.0						
	6.0		6.0				22
	7.0						
	7.5						36
	8.0						
	9.0		9.0				29
	10.0						
	10.5						43
	11.0						
	12.0		12.0				47
	13.0						
	13.5						51
	14.0						
	15.0		15.0				71
	16.0						
	16.5						67
Sand brown in colour	17.0						
	18.0		18.0				72
	19.0						
	19.5						76
	20.0						

Ground water level is below 1.7 m from the existing ground level

D/S = Disturbed Sample U/S = Undisturbed Sample S.P.T. = Standard Penetration Test

SOIL & FOUNDATION CONSULTANT. Depth of Sampler = 0.45 m

Type of Boring : Shell/Auger	Bore Hole NO.02	Date Started :08.10.2025 Date Completed :08.10.2025

DESCRIPTION OF STRATA	DEPTH (m)	STRATA	SAMPLE COLLECTED D/S	SAMPLE COLLECTED U/S	GROUND WATER LEVEL	Depth - N-value curve (10 20 30 40)	N - VALUE
Silty clay brown to grey in colour	1.0		1.5				1
	2.0			2.0			
	3.0		3.0				11
	4.0						
	5.0		4.5				20
	6.0		6.0				25
	7.0						
	8.0		7.5				32
	9.0		9.0				36
	10.0						
	11.0		10.5				43
	12.0		12.0				46
	13.0						
	14.0		13.5				45
	15.0		15.0				67
	16.0						
Sand brown in colour	17.0		16.5				74
	18.0		18.0				75
	19.0						
	20.0		19.5				87

Ground water level is below 1.90 m from the existing ground level

D/S = Disturbed Sample U/S = Undisturbed Sample S.P.T. = Standard Penetration Test

SOIL & FOUNDATION CONSULTANT. Depth of Sampler = 0.45 m

Type of Boring : Shell/Auger	Bore Hole NO.03	Date Started :09.10.2025 Date Completed :09.10.2025

DESCRIPTION OF STRATA	DEPTH (m)	STRATA	SAMPLE COLLECTED D/S	SAMPLE COLLECTED U/S	GROUND WATER LEVEL	Depth - N-value curve (10 20 30 40)	N - VALUE
Silty clay brown to grey in colour	1.0		1.5				2
	2.0			2.0			
	3.0		3.0				9
	4.0		4.5				13
	5.0						
	6.0		6.0				23
	7.0		7.5				35
	8.0						
	9.0		9.0				44
	10.0		10.5				45
	11.0						
	12.0		12.0				47
	13.0		13.5				60
	14.0						
	15.0		15.0				64
	16.0		16.5				79
Sand brown in colour	17.0						
	18.0		18.0				82
	19.0		19.5				85
	20.0						

Ground water level is below 1.95 m from the existing ground level

D/S = Disturbed Sample U/S = Undisturbed Sample S.P.T. = Standard Penetration Test

SOIL & FOUNDATION CONSULTANT. Depth of Sampler = 0.45 m

Type of Boring : Shell/Auger	Bore Hole NO.04	Date Started :09.10.2025 Date Completed :09.10.2025

DESCRIPTION OF STRATA	DEPTH (m)	STRATA	SAMPLE COLLECTED D/S	SAMPLE COLLECTED U/S	GROUND WATER LEVEL	Depth - N-value curve (10 20 30 40)	N - VALUE
Silty clay brown to grey in colour	1.0		1.5				1
	2.0			2.0			
	3.0		3.0				9
	4.0						
	4.5						15
	5.0						
	6.0		6.0				20
	7.0						
	7.5						25
	8.0						
	9.0		9.0				45
	10.0						
	10.5						47
	11.0						
	12.0		12.0				53
	13.0						
	13.5						54
	14.0						
	15.0		15.0				65
	16.0						
	16.5						70
Sand brown in colour	17.0						
	18.0		18.0				72
	19.0						
	19.5						81
	20.0						

Ground water level is above 2.05 m from the existing ground level

D/S = Disturbed Sample U/S = Undisturbed Sample S.P.T. = Standard Penetration Test

SOIL & FOUNDATION CONSULTANT. Depth of Sampler = 0.45 m

RESULTS OF LABORATORY TEST

BORE HOLE NO.	SAMPLE NO.	DEPTH IN METERS	Type of Sample	WATER CONTENT (%	VOID RATIO	SPECIFIC GRAVITY	DENSITY		LIMITS (%)			GRAIN SIZE ANALYSIS (%)				TRIAXIAL TEST		DIRECT SHEAR TEST		Free Swell Index	IS CLASSIFICATION OF SOIL
							DRY (gm/cc)	WET (gm/cc)	LIQUID	PLASTIC	PLASTICITY INDEX	Gravel	Sand	Hydrometer Analysis		c (kg/cm^2)	ϕ Degree	c (kg/cm^2)	ϕ Degree		
														Silt	Clay						
1	1	1.50	DS	29.96	-	2.625	-	-	-	-	-	-	10.00	31.00	59.00	-	-	0.20	18.50	-	SC
	2	3.00	DS	28.01	-	2.636	-	-	-	-	-	-	77.00	23.00	-	-	-	-	29.13	-	SM
	3	4.50	DS	29.02	-	2.647	-	-	-	-	-	-	80.00	20.00	-	-	-	-	29.30	-	SM
	4	6.00	DS	27.09	-	2.659	-	-	-	-	-	-	79.00	21.00	-	-	-	-	29.44	-	SM
	5	7.50	DS	30.02	-	2.658	-	-	-	-	-	-	83.00	17.00	-	-	-	-	29.50	-	SM
	6	9.00	DS	28.74	-	2.663	-	-	-	-	-	-	82.00	18.00	-	-	-	-	29.53	-	SM
	7	10.50	DS	27.28	-	2.662	-	-	-	-	-	-	80.00	20.00	-	-	-	-	29.57	-	SM
	8	12.00	DS	22.58	-	2.667	-	-	-	-	-	-	79.00	21.00	-	-	-	-	29.60	-	SM
	9	13.50	DS	23.72	-	2.668	-	-	-	-	-	-	84.00	16.00	-	-	-	-	29.75	-	SM
	10	15.00	DS	21.45	-	2.669	-	-	-	-	-	-	87.00	13.00	-	-	-	-	30.07	-	SM
	11	16.50	DS	20.90	-	2.671	-	-	-	-	-	-	83.00	17.00	-	-	-	-	30.38	-	SM
	12	18.00	DS	18.41	-	2.673	-	-	-	-	-	-	82.00	18.00	-	-	-	-	30.73	-	SM
	13	19.50	DS	18.61	-	2.675	-	-	-	-	-	-	84.00	16.00	-	-	-	-	31.07	-	SM

UCT -Unconfined compression Test, UD -Unconfined Drained Test, UU -Unconfined Undrained Test, DS - Disturbed Sample, UDS - Undisturbed Sample

The soil is Non Expansive

RESULTS OF LABORATORY TEST

BORE HOLE NO.	SAMPLE NO.	DEPTH IN METERS	Type of Sample	WATER CONTENT (%	VOID RATIO	SPECIFIC GRAVITY	DENSITY		LIMITS (%)			GRAIN SIZE ANALYSIS (%)				TRIAXIAL TEST		DIRECT SHEAR TEST		Free Swell Index	IS CLASSIFICATION OF SOIL
							DRY (gm/cc)	WET (gm/cc)	LIQUID	PLASTIC	PLASTICITY INDEX	Gravel	Sand	Hydrometer Analysis		c (kg/cm^2)	ϕ Degree	c (kg/cm^2)	ϕ Degree		
														Silt	Clay						
2	1	1.50	DS	31.82	-	2.622	-	-	-	-	-	-	17.00	30.00	53.00	-	-	0.18	20.09	-	SC
	2	3.00	DS	29.75	-	2.634	-	-	-	-	-	-	85.00	15.00	-	-	-	-	29.15	-	SM
	3	4.50	DS	30.82	-	2.642	-	-	-	-	-	-	87.00	13.00	-	-	-	-	29.17	-	SM
	4	6.00	DS	28.77	-	2.648	-	-	-	-	-	-	86.00	14.00	-	-	-	-	29.22	-	SM
	5	7.50	DS	31.89	-	2.653	-	-	-	-	-	-	89.00	11.00	-	-	-	-	29.28	-	SM
	6	9.00	DS	30.53	-	2.655	-	-	-	-	-	-	88.00	12.00	-	-	-	-	29.33	-	SM
	7	10.50	DS	28.97	-	2.661	-	-	-	-	-	-	87.00	13.00	-	-	-	-	29.40	-	SM
	8	12.00	DS	23.98	-	2.663	-	-	-	-	-	-	86.00	14.00	-	-	-	-	29.80	-	SM
	9	13.50	DS	25.20	-	2.667	-	-	-	-	-	-	90.00	10.00	-	-	-	-	29.94	-	SM
	10	15.00	DS	22.78	-	2.669	-	-	-	-	-	-	91.00	9.00	-	-	-	-	31.18	-	SM
	11	16.50	DS	22.20	-	2.668	-	-	-	-	-	-	89.00	11.00	-	-	-	-	31.28	-	SM
	12	18.00	DS	19.55	-	2.669	-	-	-	-	-	-	88.00	12.00	-	-	-	-	31.37	-	SM
	13	19.50	DS	19.76	-	2.672	-	-	-	-	-	-	90.00	10.00	-	-	-	-	31.44	-	SM

UCT -Unconfined compression Test, UD -Unconfined Drained Test, UU -Unconfined Undrained Test, DS - Disturbed Sample, UDS - Undisturbed Sample

The soil is Non Expansive

RESULTS OF LABORATORY TEST

BORE HOLE NO.	SAMPLE NO.	DEPTH IN METERS	Type of Sample	WATER CONTENT (%	VOID RATIO	SPECIFIC GRAVITY	DENSITY		LIMITS (%)			GRAIN SIZE ANALYSIS (%)				TRIAXIAL TEST		DIRECT SHEAR TEST		Free Swell Index	IS CLASSIFICATION OF SOIL
							DRY (gm/cc)	WET (gm/cc)	LIQUID	PLASTIC	PLASTICITY INDEX	Gravel	Sand	Hydrometer Analysis		c (kg/cm^2)	ϕ Degree	c (kg/cm^2)	ϕ Degree		
														Silt	Clay						
3	1	1.50	DS	29.53	-	2.647	-	-	-	-	-	-	16.00	25.00	59.00	-	-	0.19	20.33	-	SC
	2	3.00	DS	27.61	-	2.655	-	-	-	-	-	-	84.00	16.00	-	-	-	-	29.11	-	SM
	3	4.50	DS	28.60	-	2.659	-	-	-	-	-	-	87.00	13.00	-	-	-	-	29.26	-	SM
	4	6.00	DS	26.70	-	2.663	-	-	-	-	-	-	86.00	14.00	-	-	-	-	29.31	-	SM
	5	7.50	DS	29.59	-	2.667	-	-	-	-	-	-	88.00	12.00	-	-	-	-	29.37	-	SM
	6	9.00	DS	28.33	-	2.668	-	-	-	-	-	-	87.00	13.00	-	-	-	-	29.59	-	SM
	7	10.50	DS	26.89	-	2.669	-	-	-	-	-	-	87.00	13.00	-	-	-	-	29.66	-	SM
	8	12.00	DS	22.26	-	2.673	-	-	-	-	-	-	86.00	14.00	-	-	-	-	30.06	-	SM
	9	13.50	DS	23.38	-	2.675	-	-	-	-	-	-	89.00	11.00	-	-	-	-	30.21	-	SM
	10	15.00	DS	21.14	-	2.673	-	-	-	-	-	-	91.00	9.00	-	-	-	-	30.36	-	SM
	11	16.50	DS	20.60	-	2.678	-	-	-	-	-	-	88.00	12.00	-	-	-	-	30.47	-	SM
	12	18.00	DS	18.14	-	2.067	-	-	-	-	-	-	87.00	13.00	-	-	-	-	30.82	-	SM
	13	19.50	DS	18.34	-	2.673	-	-	-	-	-	-	89.00	11.00	-	-	-	-	31.07	-	SM

UCT -Unconfined compression Test, UD -Unconfined Drained Test, UU -Unconfined Undrained Test, DS - Disturbed Sample, UDS - Undisturbed Sample

The soil is Non Expansive

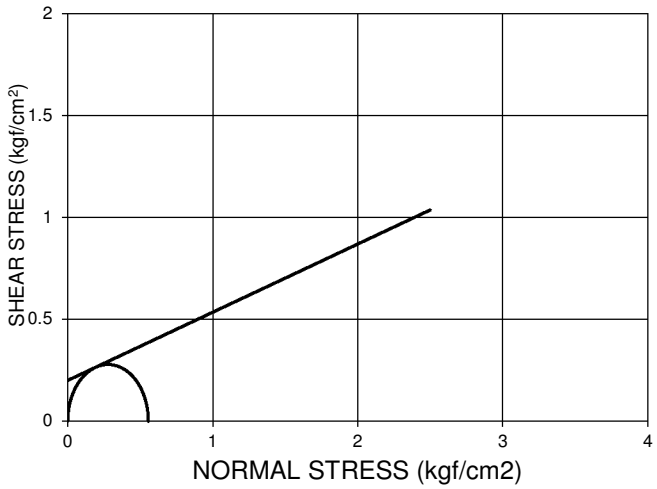
RESULTS OF LABORATORY TEST

BORE HOLE NO.	SAMPLE NO.	DEPTH IN METERS	Type of Sample	WATER CONTENT (%	VOID RATIO	SPECIFIC GRAVITY	DENSITY		LIMITS (%)			GRAIN SIZE ANALYSIS (%)				TRIAXIAL TEST		DIRECT SHEAR TEST		Free Swell Index	IS CLASSIFICATION OF SOIL
							DRY (gm/cc)	WET (gm/cc)	LIQUID	PLASTIC	PLASTICITY INDEX	Gravel	Sand	Hydrometer Analysis		c (kg/cm^2)	ϕ Degree	c (kg/cm^2)	ϕ Degree		
														Silt	Clay						
4	1	1.50	DS	30.24	-	2.654	-	-	-	-	-	-	10.20	41.28	48.52	-	-	0.17	21.26	-	SC
	2	3.00	DS	28.27	-	2.668	-	-	-	-	-	-	81.83	18.17	-	-	-	-	29.33	-	SM
	3	4.50	DS	29.29	-	2.672	-	-	-	-	-	-	84.86	15.14	-	-	-	-	29.68	-	SM
	4	6.00	DS	27.34	-	2.669	-	-	-	-	-	-	83.85	16.15	-	-	-	-	30.93	-	SM
	5	7.50	DS	30.30	-	2.667	-	-	-	-	-	-	86.88	13.12	-	-	-	-	30.99	-	SM
	6	9.00	DS	29.01	-	2.672	-	-	-	-	-	-	85.87	14.13	-	-	-	-	31.22	-	SM
	7	10.50	DS	27.53	-	2.673	-	-	-	-	-	-	84.86	15.14	-	-	-	-	31.29	-	SM
	8	12.00	DS	22.79	-	2.674	-	-	-	-	-	-	83.85	16.15	-	-	-	-	31.72	-	SM
	9	13.50	DS	23.95	-	2.669	-	-	-	-	-	-	87.89	12.11	-	-	-	-	31.87	-	SM
	10	15.00	DS	21.65	-	2.674	-	-	-	-	-	-	89.91	10.09	-	-	-	-	31.93	-	SM
	11	16.50	DS	21.10	-	2.673	-	-	-	-	-	-	86.88	13.12	-	-	-	-	32.11	-	SM
	12	18.00	DS	18.58	-	2.675	-	-	-	-	-	-	85.87	14.13	-	-	-	-	32.47	-	SM
	13	19.50	DS	18.78	-	2.677	-	-	-	-	-	-	87.89	12.11	-	-	-	-	32.54	-	SM

UCT -Unconfined compression Test, UD -Unconfined Drained Test, UU -Unconfined Undrained Test, DS - Disturbed Sample, UDS - Undisturbed Sample

The soil is Non Expansive

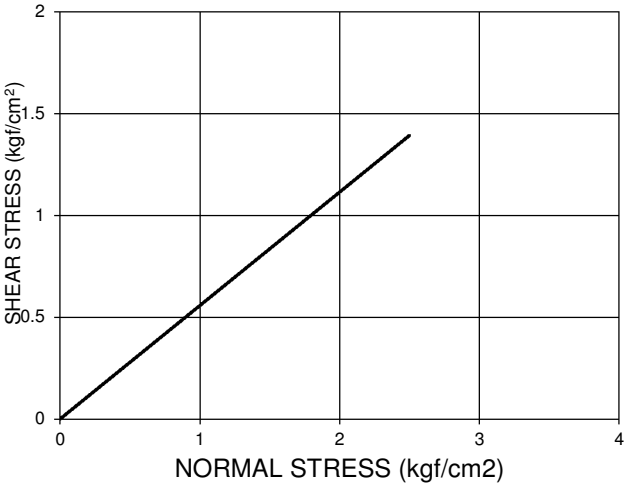
SHEAR TEST GRAPH



BH NO: 1 C = 0.200 kgf/cm^2

DEPTH: 1.5 m Φ = 18.50 ^{O}

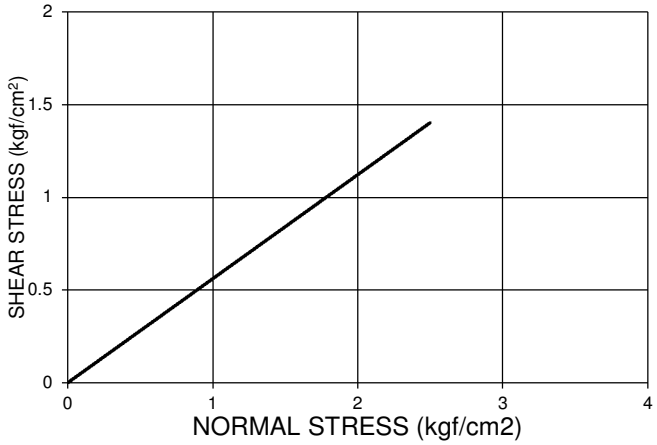
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 3.0 m Φ = 29.13 ^{O}

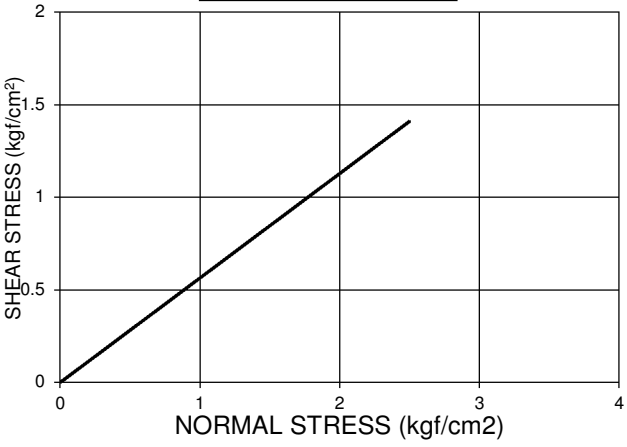
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 4.5 m Φ = 29.30 ^{O}

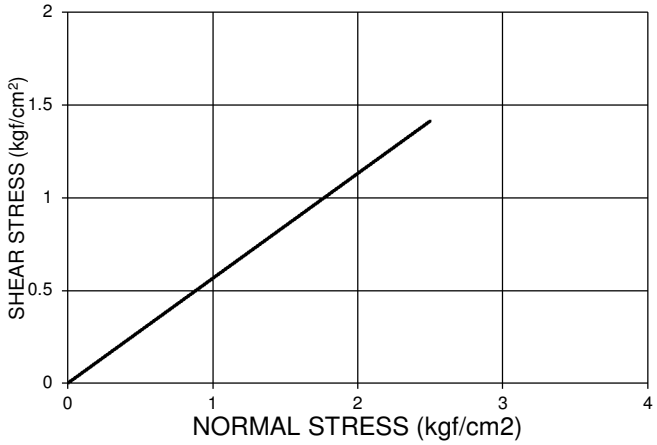
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 6.0 m Φ = 29.44 ^{O}

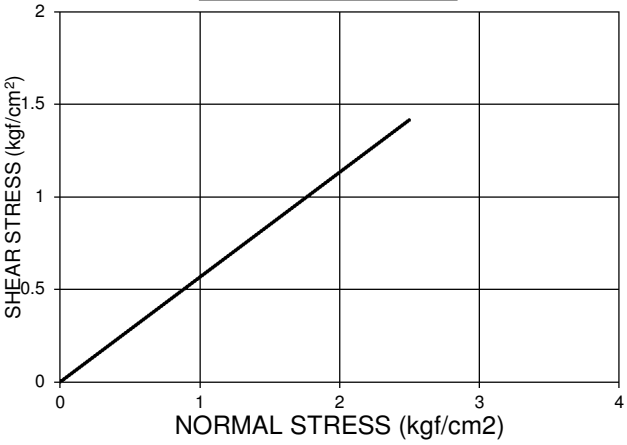
SHEAR TEST GRAPH



BH NO: 1 C = 0.00 kgf/cm^2

DEPTH: 7.5 m Φ = 29.50 ^{O}

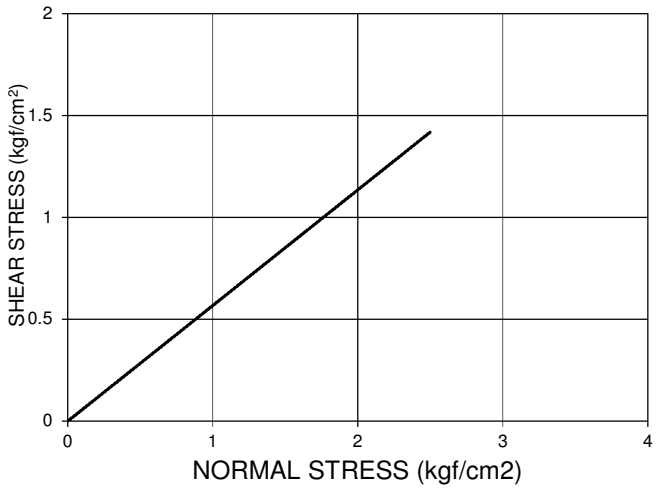
SHEAR TEST GRAPH



BH NO: 1 C = 0.00 kgf/cm^2

DEPTH: 9.0 m Φ = 29.53 ^{O}

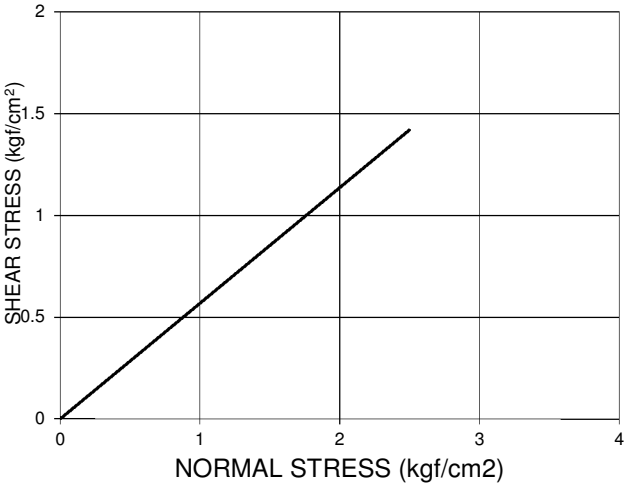
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 10.5 m Φ = 29.57 ^{O}

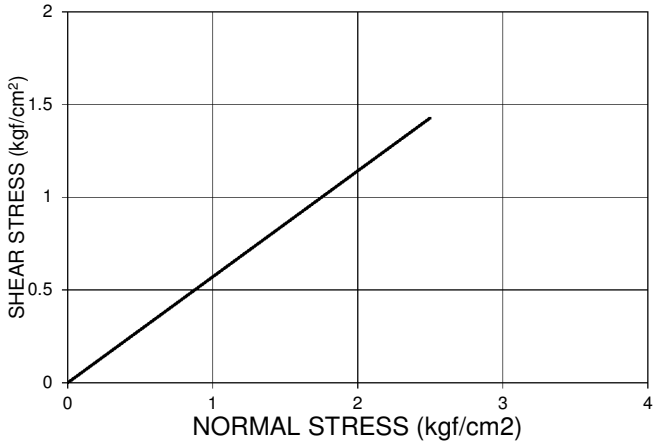
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 12.0 m Φ = 29.60 ^{O}

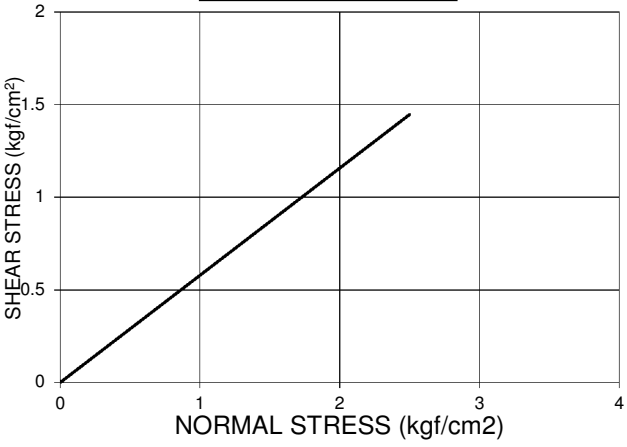
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 13.5 m Φ = 29.75 ^{O}

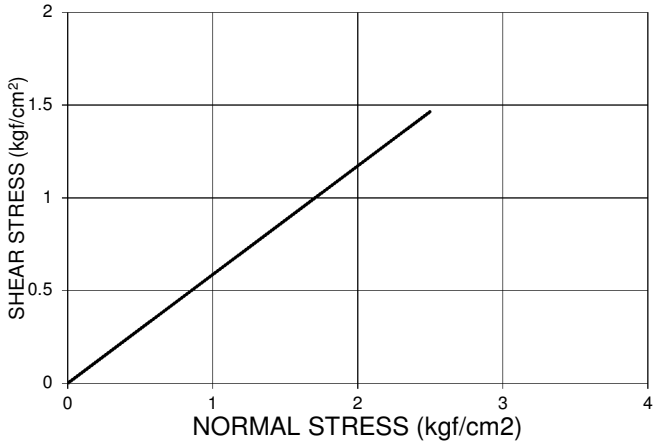
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 15.0 m Φ = 30.07 ^{O}

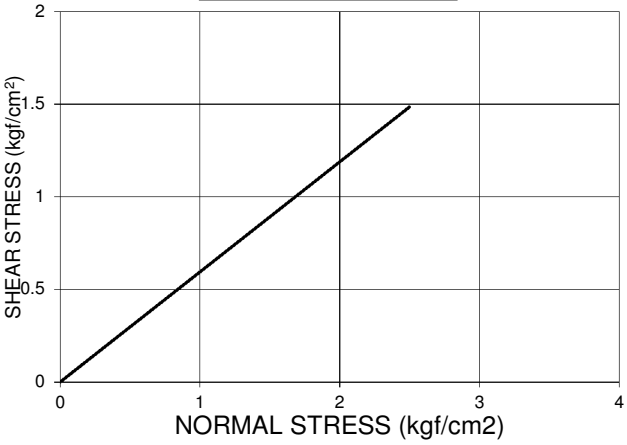
SHEAR TEST GRAPH



BH NO: 1 C = 0.00 kgf/cm^2

DEPTH: 16.5 m Φ = 30.38 ^{O}

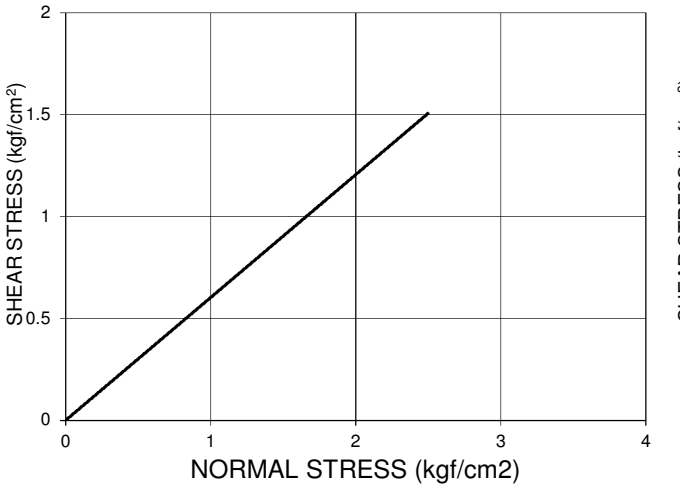
SHEAR TEST GRAPH



BH NO: 1 C = 0.00 kgf/cm^2

DEPTH: 18.0 m Φ = 30.73 ^{O}

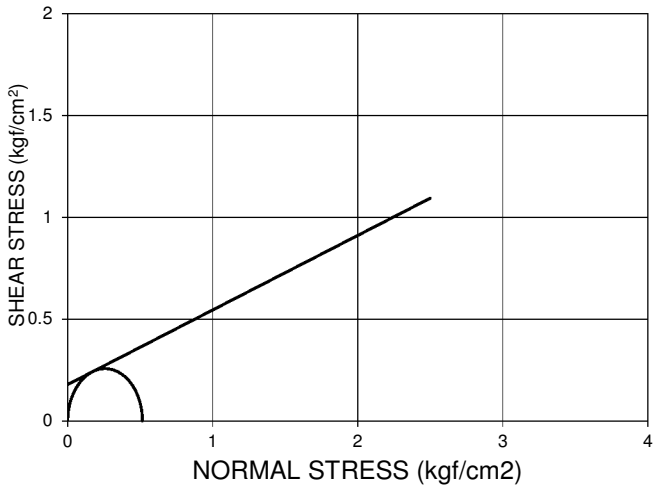
SHEAR TEST GRAPH



BH NO: 1 C = 0.000 kgf/cm^2

DEPTH: 19.5 m Φ = 31.07 ^{O}

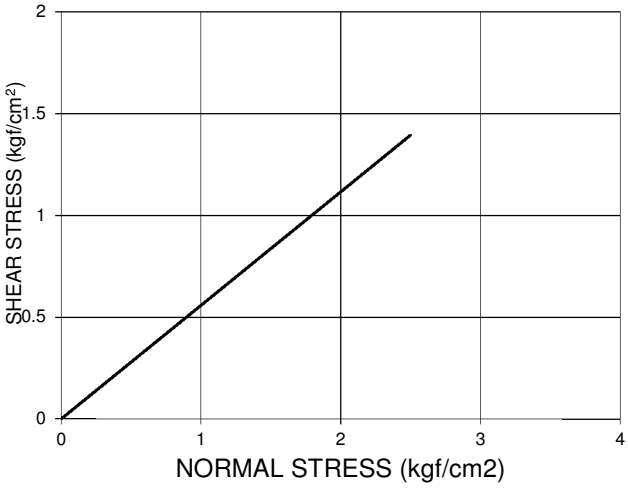
SHEAR TEST GRAPH



BH NO: 2 C = 0.180 kgf/cm^2

DEPTH: 1.5 m Φ = 20.09 ^{O}

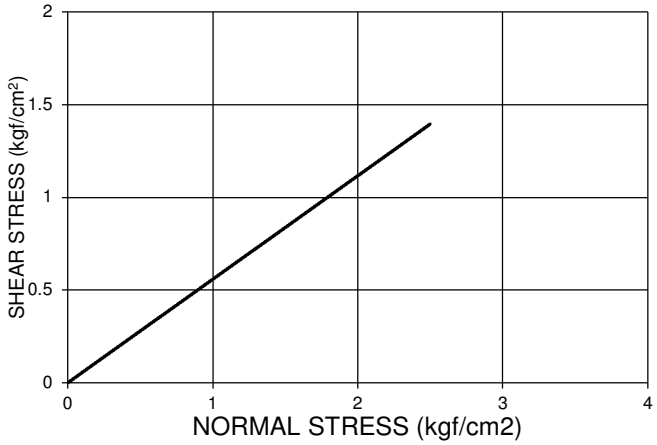
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 3.0 m Φ = 29.15 ^{O}

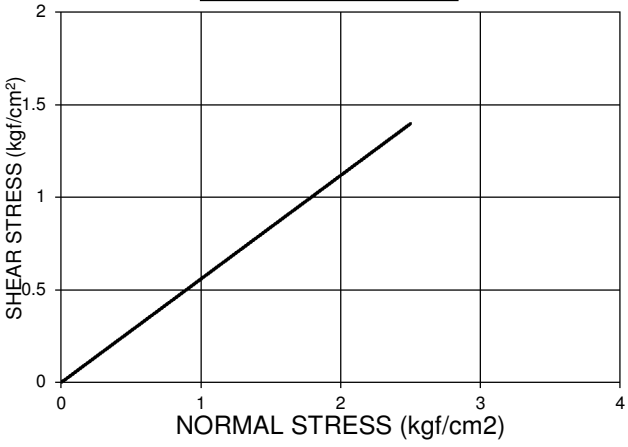
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 4.5 m Φ = 29.17 ^{O}

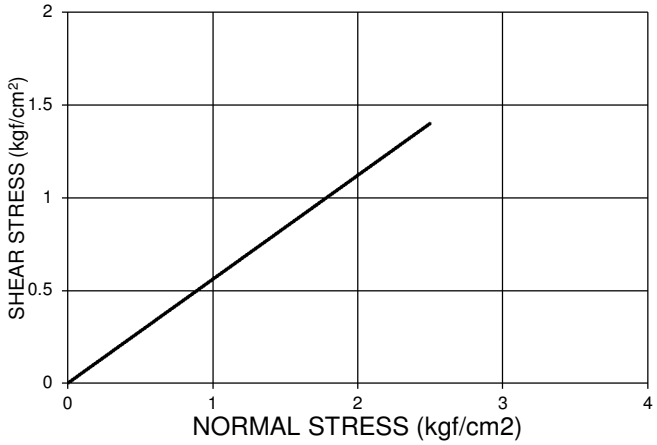
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 6.0 m Φ = 29.22 ^{O}

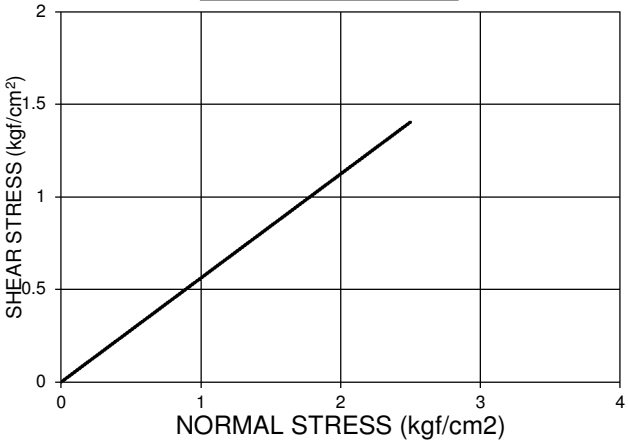
SHEAR TEST GRAPH



BH NO: 2 C = 0.00 kgf/cm^2

DEPTH: 7.5 m Φ = 29.28 ^{O}

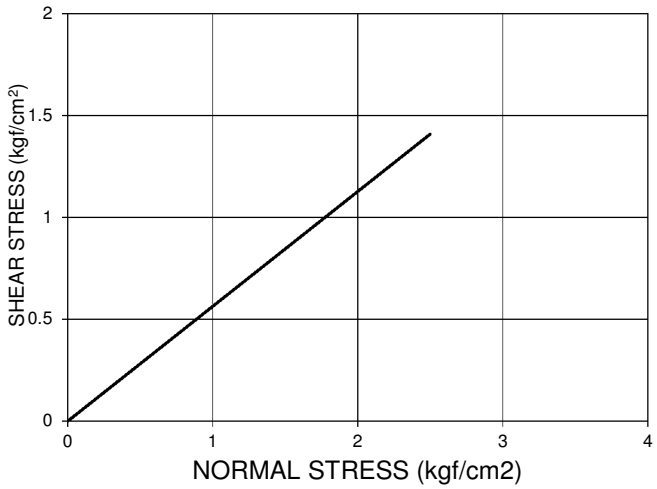
SHEAR TEST GRAPH



BH NO: 2 C = 0.00 kgf/cm^2

DEPTH: 9.0 m Φ = 29.33 ^{O}

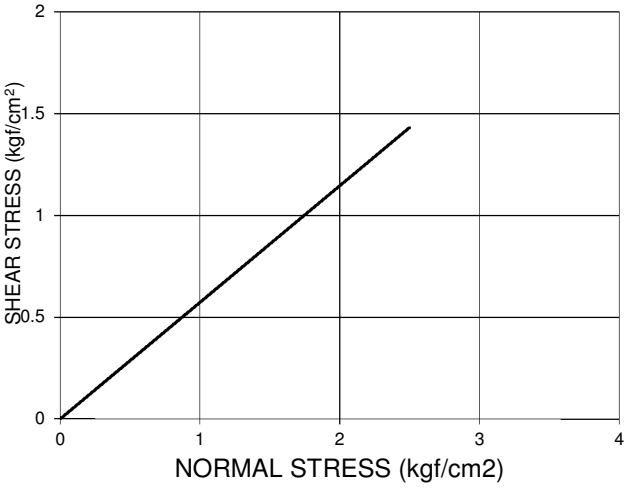
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 10.5 m Φ = 29.40 ^{O}

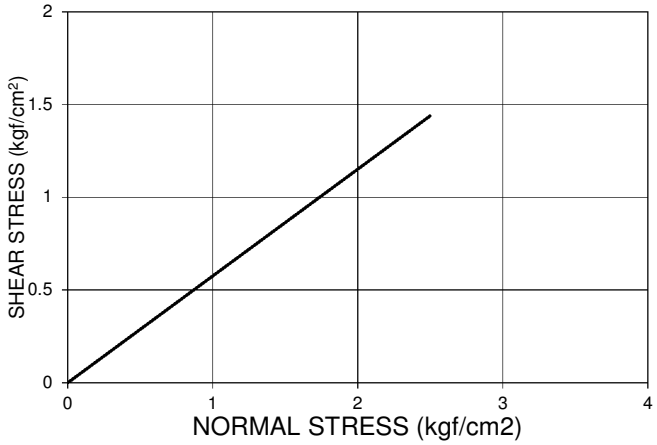
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 12.0 m Φ = 29.80 ^{O}

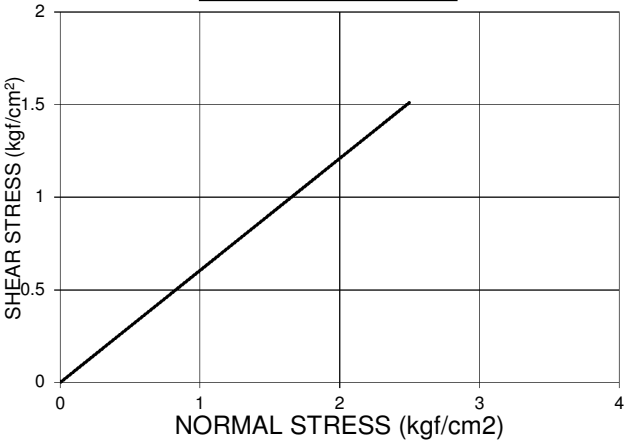
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 13.5 m Φ = 29.94 ^{O}

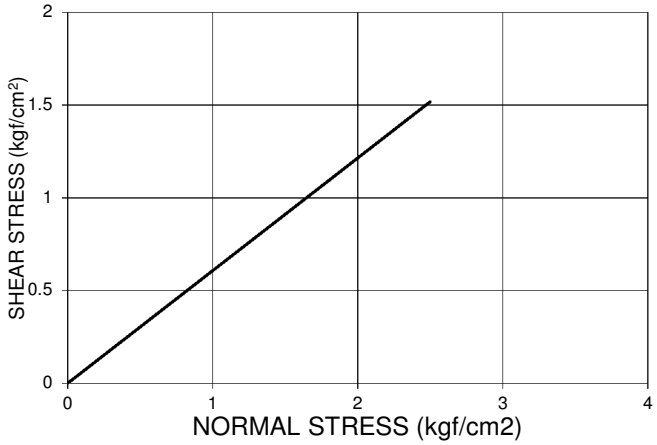
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 15.0 m Φ = 31.18 ^{O}

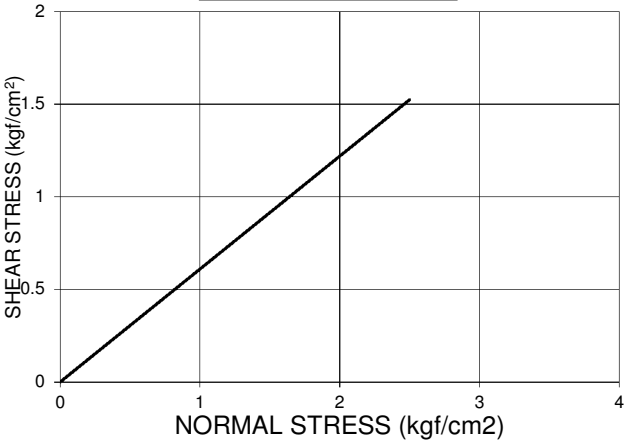
SHEAR TEST GRAPH



BH NO: 2 C = 0.00 kgf/cm^2

DEPTH: 16.5 m Φ = 31.28 ^{O}

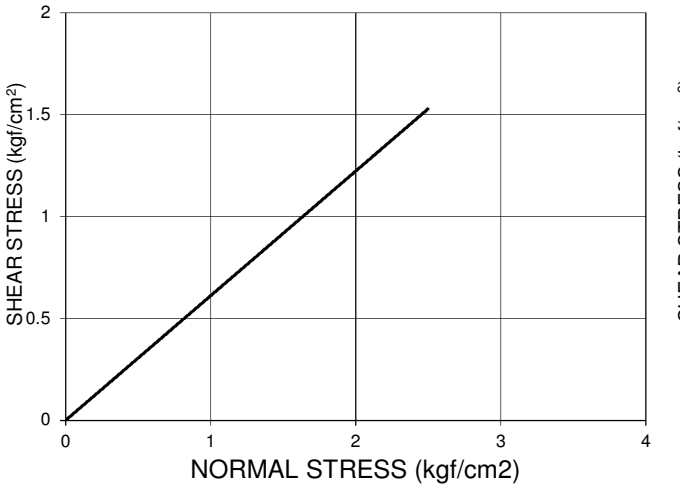
SHEAR TEST GRAPH



BH NO: 2 C = 0.00 kgf/cm^2

DEPTH: 18.0 m Φ = 31.37 ^{O}

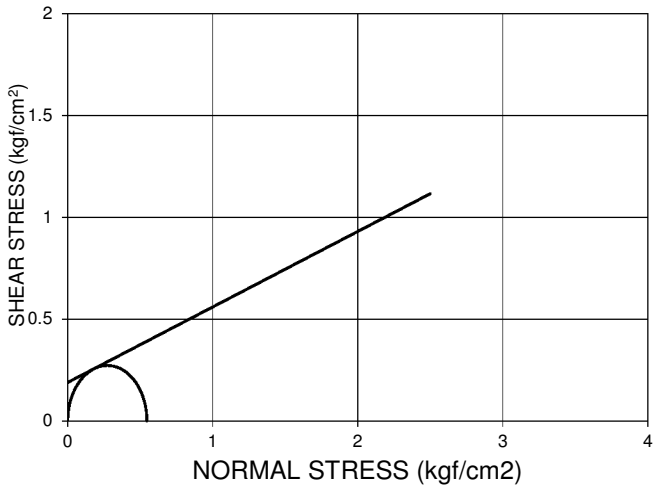
SHEAR TEST GRAPH



BH NO: 2 C = 0.000 kgf/cm^2

DEPTH: 19.5 m Φ = 31.44 ^{O}

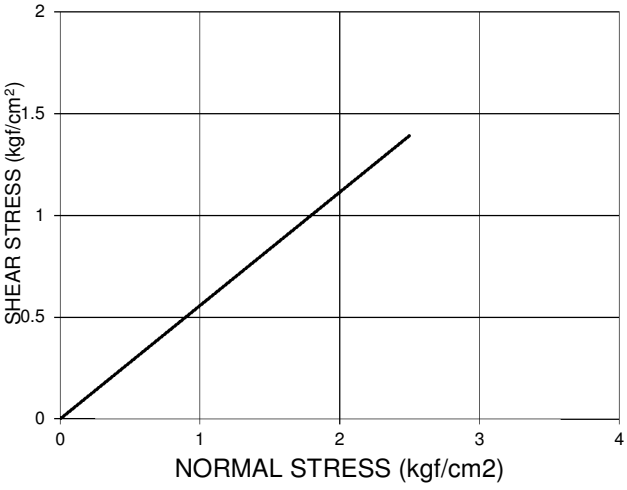
SHEAR TEST GRAPH



BH NO: 3 C = 0.190 kgf/cm^2

DEPTH: 1.5 m Φ = 20.33 ^{O}

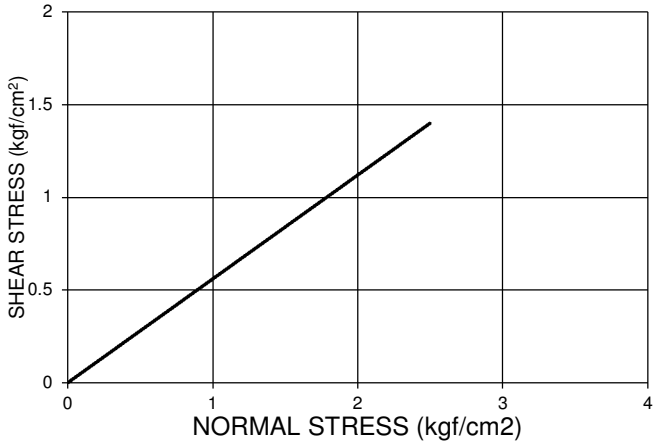
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 3.0 m Φ = 29.11 ^{O}

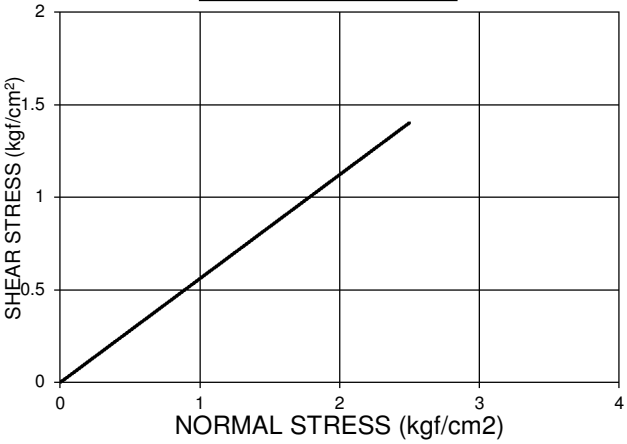
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 4.5 m Φ = 29.26 ^{O}

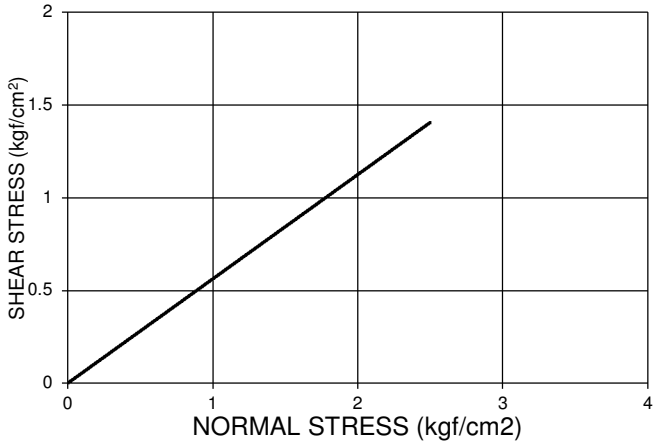
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 6.0 m Φ = 29.31 ^{O}

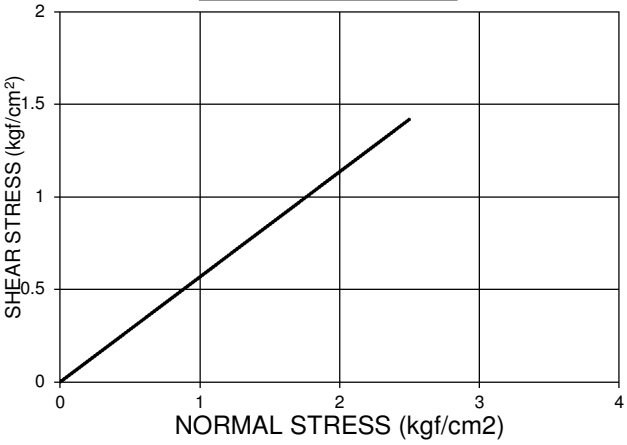
SHEAR TEST GRAPH



BH NO: 3 C = 0.00 kgf/cm^2

DEPTH: 7.5 m Φ = 29.37 ^{O}

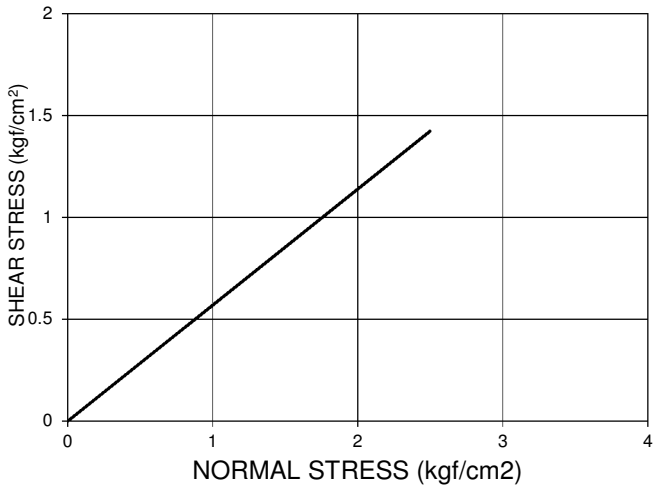
SHEAR TEST GRAPH



BH NO: 3 C = 0.00 kgf/cm^2

DEPTH: 9.0 m Φ = 29.59 ^{O}

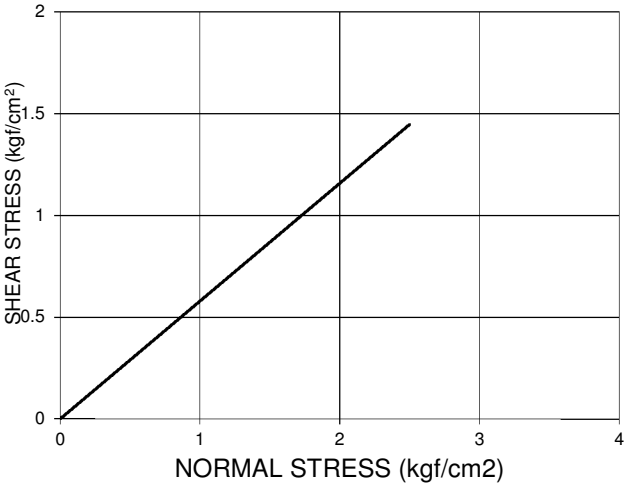
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 10.5 m Φ = 29.66 ^{O}

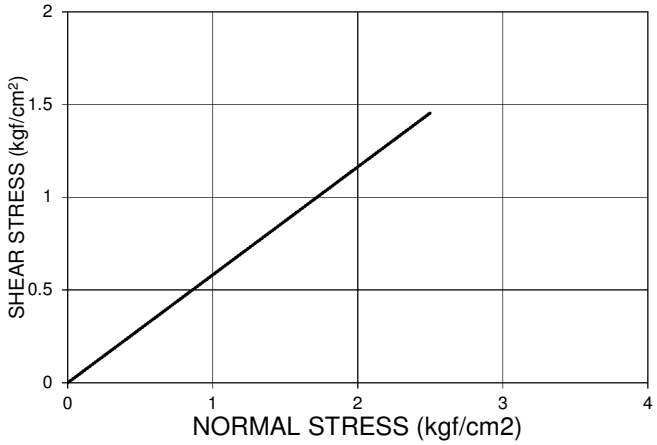
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 12.0 m Φ = 30.06 ^{O}

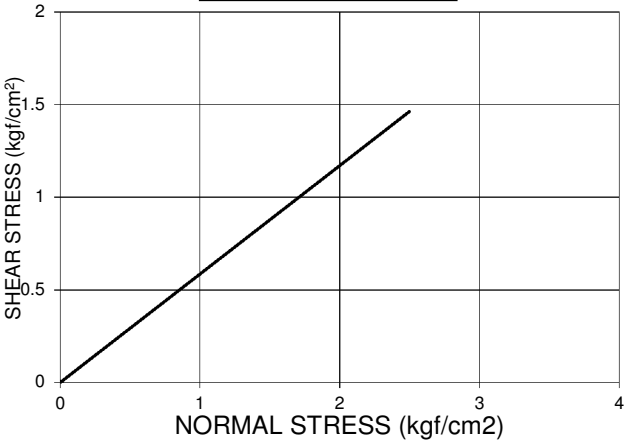
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 13.5 m Φ = 30.21 ^{O}

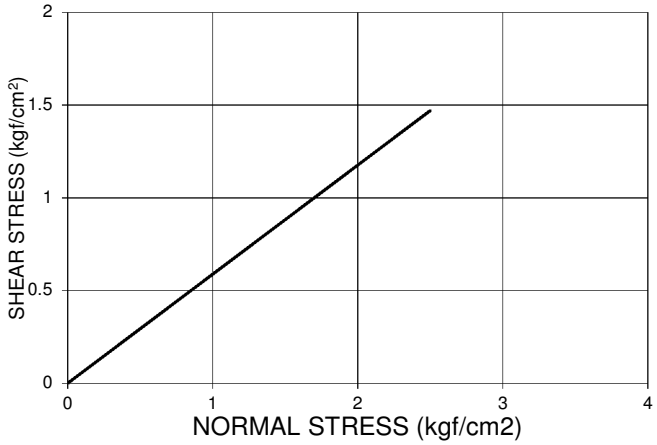
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 15.0 m Φ = 30.36 ^{O}

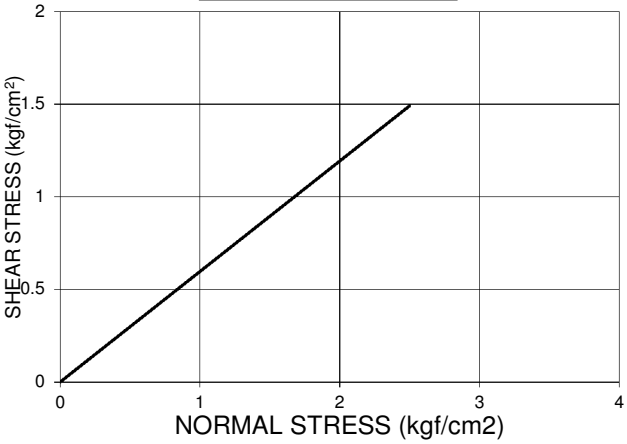
SHEAR TEST GRAPH



BH NO: 3 C = 0.00 kgf/cm^2

DEPTH: 16.5 m Φ = 30.47 ^{O}

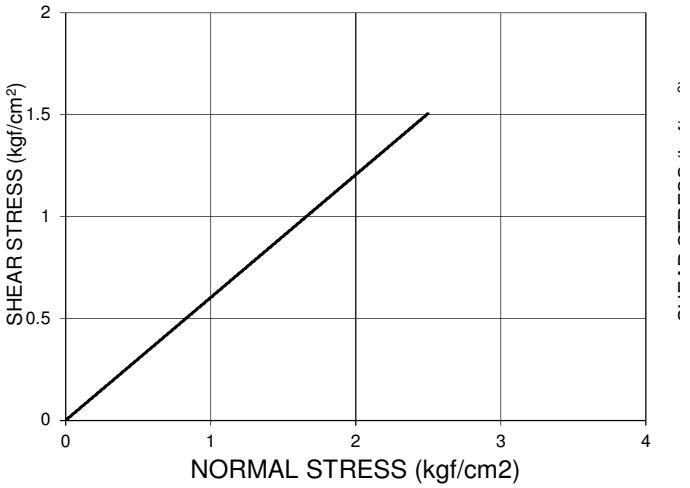
SHEAR TEST GRAPH



BH NO: 3 C = 0.00 kgf/cm^2

DEPTH: 18.0 m Φ = 30.82 ^{O}

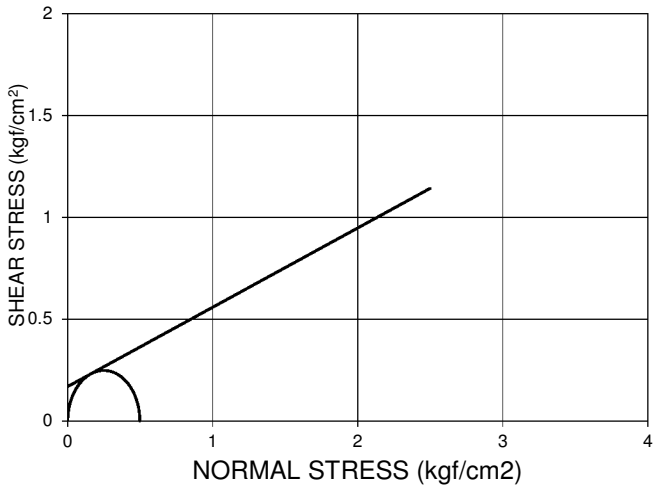
SHEAR TEST GRAPH



BH NO: 3 C = 0.000 kgf/cm^2

DEPTH: 19.5 m Φ = 31.07 ^{O}

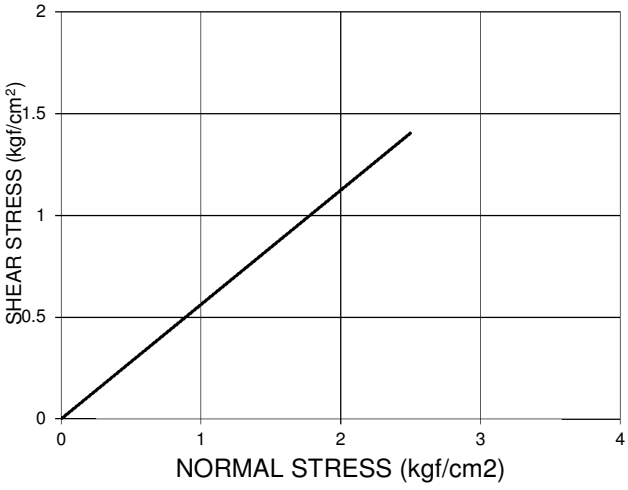
SHEAR TEST GRAPH



BH NO: 4 C = 0.170 kgf/cm^2

DEPTH: 1.5 m Φ = 21.3 ^{O}

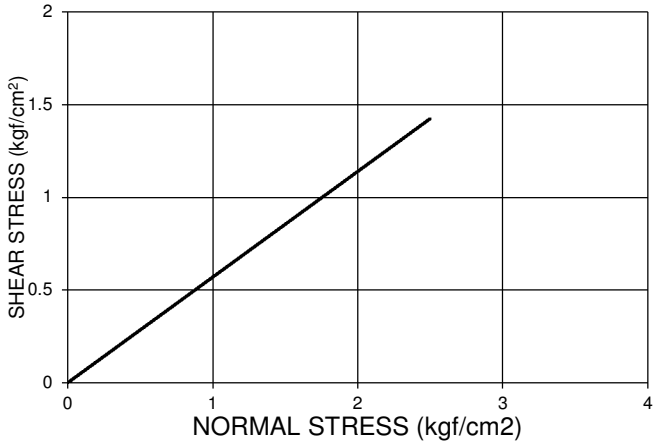
SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 3.0 m Φ = 29.3 ^{O}

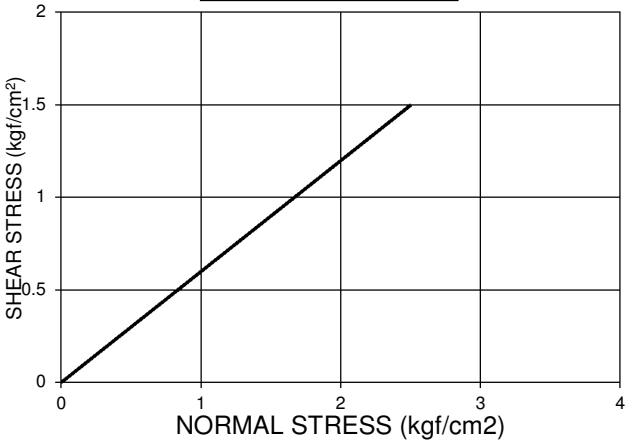
SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 4.5 m Φ = 29.7 ^{O}

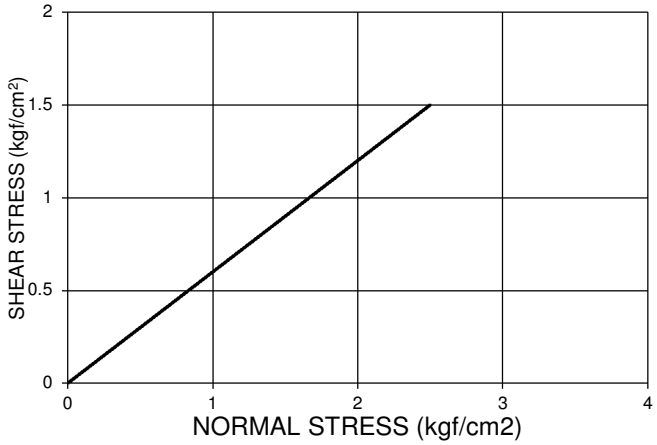
SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 6.0 m Φ = 30.93 ^{O}

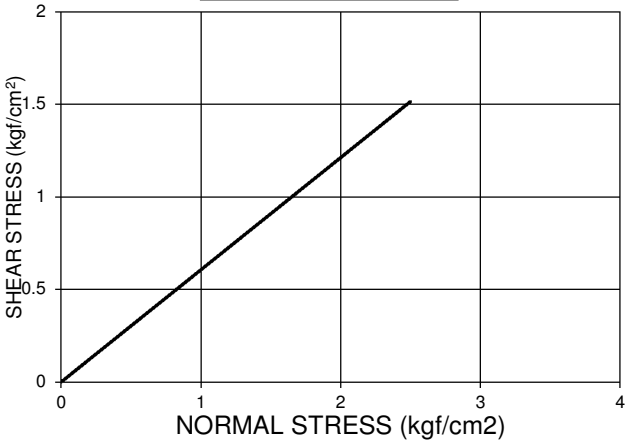
SHEAR TEST GRAPH



BH NO: 4 C = 0.00 kgf/cm^2

DEPTH: 7.5 m Φ = 30.99 ^{O}

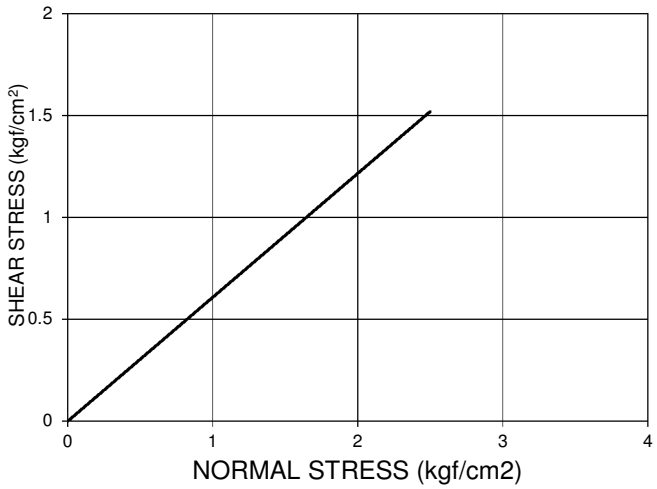
SHEAR TEST GRAPH



BH NO: 4 C = 0.00 kgf/cm^2

DEPTH: 9.0 m Φ = 31.22 ^{O}

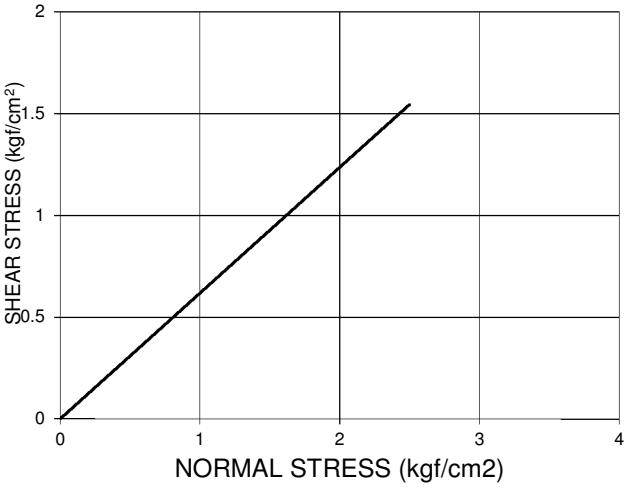
SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 10.5 m Φ = 31.29 ^{O}

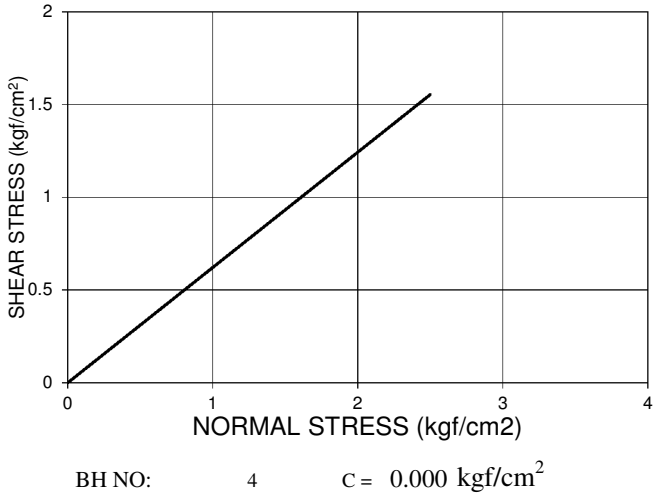
SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 12.0 m Φ = 31.72 ^{O}

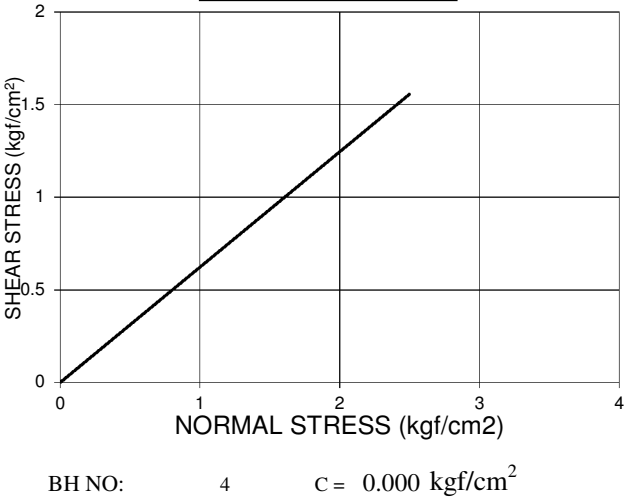
SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 13.5 m Φ = 31.87 ^{O}

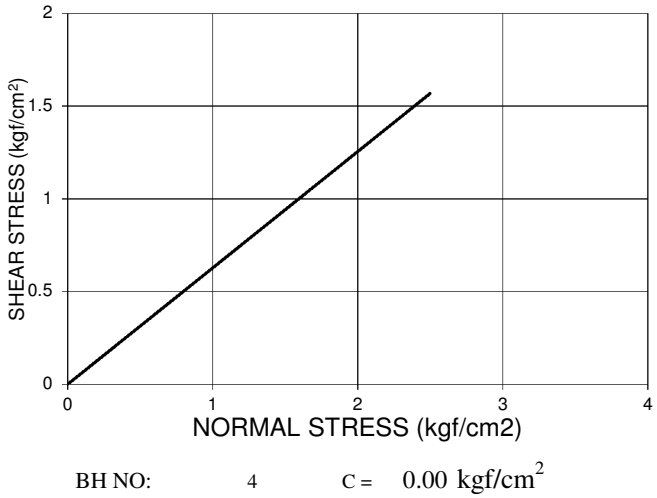
SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 15.0 m Φ = 31.93 ^{O}

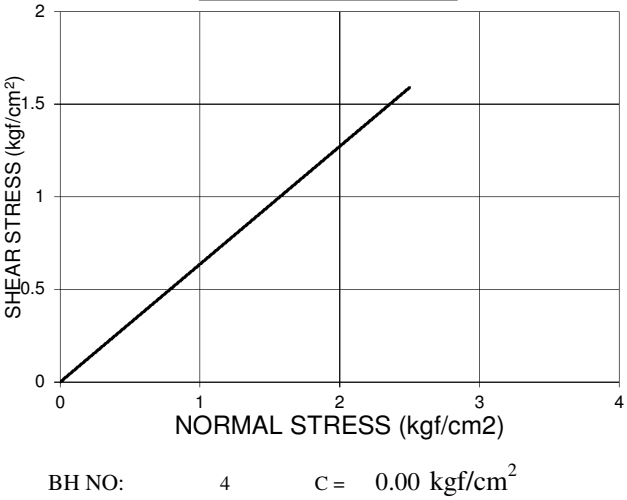
SHEAR TEST GRAPH



BH NO: 4 C = 0.00 kgf/cm^2

DEPTH: 16.5 m Φ = 32.11 ^{O}

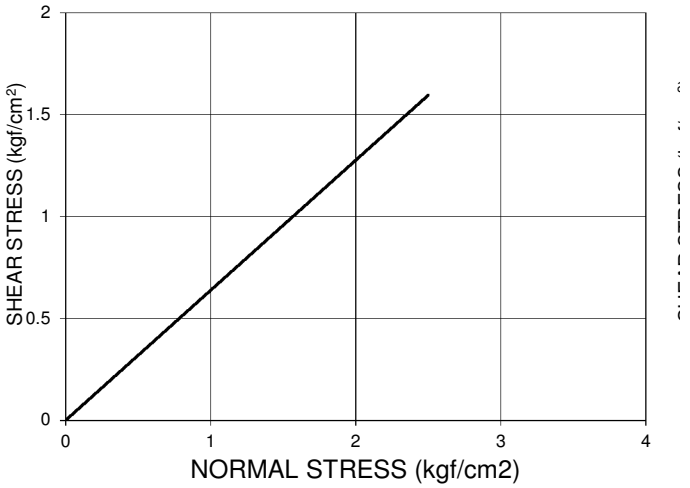
SHEAR TEST GRAPH



BH NO: 4 C = 0.00 kgf/cm^2

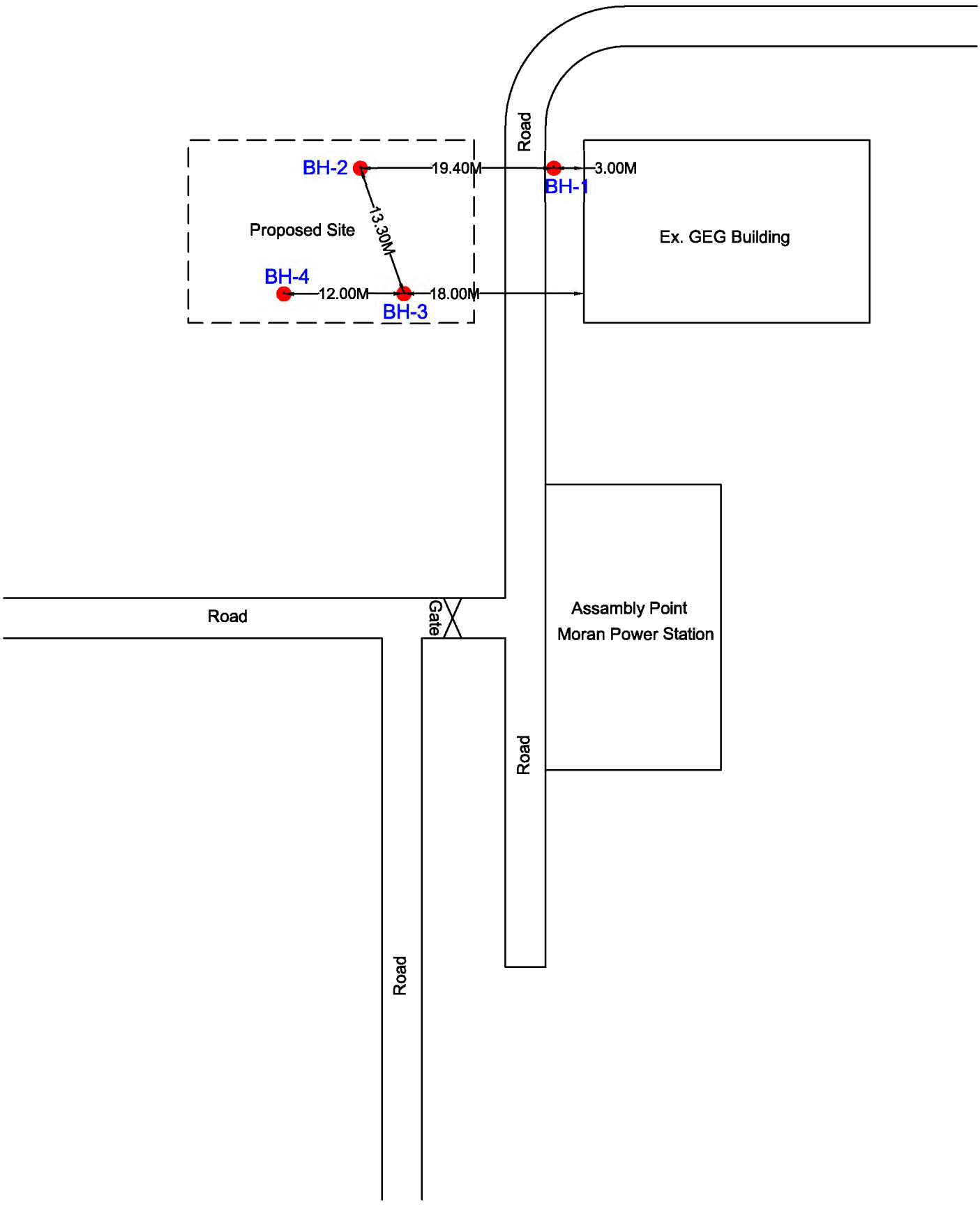
DEPTH: 18.0 m Φ = 32.47 ^{O}

SHEAR TEST GRAPH



BH NO: 4 C = 0.000 kgf/cm^2

DEPTH: 19.5 m Φ = 32.54 ^{O}



Site Plan
Moran Power Station

PHOTOGRAPH



BH-1



BH-2



BH-3



BH-4


BORE HOLE NO-01
DIS
DEPTH - 1.50m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 9.00m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 3.00m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 10.50m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 4.50m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 12.00m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 6.00m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 13.50m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 7.50m
MORAN POWER STATION
BORE HOLE NO-01
DIS
DEPTH - 15.00m
MORAN POWER STATION

BH-1


B.H NO - 02
D15
Depth - 1.50m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 3.00m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 18.50m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 21.00m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 10.50m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 4.50m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 12.00m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 18.00m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 6.00m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 13.50m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 19.50m
MORAN POWER STATION
B.H NO - 02
D13
Depth - 7.50m
MORAN POWER STATION
B.H NO - 02
D15
Depth - 15.00m
MORAN POWER STATION

BH-2


B.H No - 03
D/3
Depth - 1.50m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 3.00m
MORAN Power STATION
B.H No - 03
D/3
Depth - 4.50m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 6.00m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 7.50m
B.H No - 03
D/3
Depth - 9.00m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 10.50m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 12.00m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 13.50m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 15.00m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 16.50m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 18.00m
MORAN POWER STATION
B.H No - 03
D/3
Depth - 19.50m
MORAN POWER STATION

BH-3


B.H NO - 04
D/S
Depth - 1.50m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 3.00m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 4.50m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 6.00m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 7.50m
B.H NO - 04
D/S
Depth - 9.00m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 10.50m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 12.00m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 13.50m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 15.00m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 16.50m
MORAN POWER STATION
B.H NO - 04
D/S
Depth - 18.00m
MORAN POWER STATION

BH-4

A27_Scope Matrix

Sl. No.	Item Description	Bidder's Responsibility	Bidder's Remark(Y/N)
	Electrical Items		
1	Design, Manufacture, Supply, Erection, Insatallation & commissioning of E-house Substation	☑	
2	Design, Supply, Installation inside E-house, testing & commissioing of 33 kV AIS panel	☑	
3	Design, Supply, Testing, insatallation & commissioing of 5MVA Oil type Transformer with transformer monitoring (Outside Ehouse) - Two(02) nos	☑	
4	Design, Supply, testing and commissioing of Neutral grounding Resistor (NGR) with On load switch (2 nos) to limit E/F 192A	☑	
5	Design, supply & installation of Nitrogen injected Fire protection System (NIFPS)	☑	
6	Design, Supply, Installation inside E-house, testing & commissioing of 11 kV AIS panel	☑	
7	Designing, Develop and modification of existing control scheme of 3 MW GEG syncroinisation panel with the help of OEM of GEG.	☑	
8	Design, Supply, Testing, insatallation & commissioing of 500KVA Dry type Transformer (Inside Ehouse)- Two(02)nos	☑	
9	Design, Supply, Installation inside E-house, testing & commissioing of LV switchgear	☑	
10	Automatic Power Factor Correction Panel with Capacitor Banks (APFC) (Capacitors Outside/inside of E House as per design)	☑	
11	Support OIL for Relay cordination, uplaoding data in IEDs	☑	
12	Design, supply, testing, installation and commissioing of Battery Charger along with Battery bank of 110 VDC	☑	
13	Design, supply, testing, installation and commissioing of UPS and Battery bank	☑	
14	Design, supply and implemention of Earthing System	☑	
15	Supply, installation, testing and commissioing lighting arrestor and surge counter	☑	
16	AC Distribution Box	☑	
17	DC Distribution Box	☑	
18	Design, Testing and implementation of Substation Automation System(SAS)	☑	
19	Design, Testing and implementation of Energy Monitoring System (EMS)	☑	
20	Design, Testing and implementation of Asset/ConditionMonitoring System(AMS)	☑	
21	Design, Testing and implementation of Fire Detection and protection system in E-house	☑	
22	Design, Testing and implementation of Illumination system of E-house both Inside and Outside	☑	

23	Removal of existing Highmast (as per design requirement of bidder) and subsequent recommisssioing after placement of E-house alog with Civil Foundation	☑	
24	Design, Testing and implementation of Air conditioing system in E-houses	☑	
25	Design, Testing and implementation of Air conditioing systemCCTV in E-houses	☑	

26	Design, Testing and implementation of Lighting protection in E-houses	☑	
27	Socket & Switches	☑	
28	Supply of cables, termination kit (as applicable) of 33 kV, 11 kV, 415 V and signal cables	☑	
29	Design, supply and installation of Cable Tray within E-House	☑	
30	Cable laying and termination of cables 33 kV, 11 kV, 415 V and signal cables	☑	
31	Feeder shifting from from GTG 11 kV switchboard to E-house 11 kV switchboard	☑	
32	Switchboard Interconnector Cable (11KV) : Dis-connection (GEG-GTG) and reconnection(GEG-E-house)	☑	
33	Design, erection of 33 kV isolator on Double pole and termination in adjacent APDCL's 33 kV metering pole	☑	
34	Cable laying of 33 kV cable and termination at both ends	☑	
35	Earthing Network within E House	☑	
36	External earthing network around Ehouse on ground & Construction of Earth pits	☑	
37	Data Storage facility-Minimum 1 months	☑	
38	Provision for enabling remote data communication	☑	
39	Fire Fighting Equipment for E-House	☑	
40	Solar panels on top of E house & inverter inside E house (Real time Monitoring and report generation facility shall be available)	☑	
41	Wall mounted Screen for SAS and HMI for EMS & Condition Monitoinring	☑	
42	Cyber-security	☑	
Civil Jobs			
1	Fire Wall(2 nos) between 5MVA transformers & Load Bank	☑	
2	Modification of GEG wall for integration with E-House control room	☑	
3	Fencing around E-House Padestals (cable chamber)	☑	
4	Site Preparartion- Levelling, earth Filling etc.	☑	
5	Design and construction of foundation	☑	
6	Foundation of outdoor equipment	☑	
7	OIL Pit, Earth Pit, Cable trench, Connecting drain	☑	
Associate Jobs			
1	Supply of Electricity, Water etc.	☑	
2	Assemble of Equipment inside E-house	☑	
	Integration of E-house with GEG control room	☑	
	Survey for enabling logistic & delivery of product at site	☑	
2	Unloading, site movement & Installation of E-House at Site	☑	
3	ISAT Test of E House at Site	☑	

4	Statuatory Approval / any other approval	☐	
5	Recommended spares for 33KV/ 11KV AIS panels/Transformer/LT panel/UPS/Battery Charger/battery bank/APFC panel/Solar panels etc.	☑	
6	Site store & security	☑	
7	On site training of each component and operation phillosphy	☑	
8	Software backup/License/Measuring Tool/Laptop	☑	

Seal & signature

Form- Declaration Relay Support

Declaration of Support for Relay

Tender No : ……

01. This is to confirm that the numerical relay models as offered against the tender are as below …… and manufactured by …… is still in the production line.

02. We confirm that support services for these numerical relay shall be provided for minimum 10 (ten) years from the Original Bid Closing Date i.e……

Bidder's Authorised Signature

Company Seal

****** End of SOW******

SECTION-III
SPECIAL CONDITIONS OF CONTRACT (SCC)

Table A: The following Clauses of SCC shall supplement and / or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Sl. No.	Terms of PART-I GCC	*Addition / Modification, if required, to be incorporated in PART-III SCC as per below*
1	**1.2.25 Mobilization** & Related clauses in GCC	The bidder shall complete the mobilization within 15(fifteen) days from the date of mobilization notice from OIL after issuance of LOA. Mobilization activity will be considered complete upon completion of the following activities: Appointment of Project Manager and reporting of Project Manager to site for initial discussion with OIL team and basic data collection for a duration minimum of 1 day.
2	**4.3 Duration of the contract**	**12** (Twelve) months from the date of commencement of the contract i.e., after completion of Mobilization.
3	**10.0 Performance Security**	**10% of Contract value**. The performance security shall be valid for 15 (fifteen) months beyond the contract period.
4	**27.0 Remuneration & Terms of Payment** & Related clauses in GCC	Bidder shall quote a single lump sum price for the entire project in the Price Schedule, covering design, engineering, manufacture, supply, transportation, civil works, erection, testing and commissioning of all equipment and associated systems as per Annexure-SOR. The Contractor shall also provide a detailed breakup of the lump sum price against major equipment in the prescribed Price Bid Breakup format **(Annexure-B).** Payment under the Contract shall be made on milestone basis linked to the progress of work and submission of supporting documents duly certified by OIL. The detailed milestone-base payment schedule is attached as Annexure–Milestone Based Payment. **COMPLIANCE TOWARDS LOCAL CONTENT** 1. Contractor shall have to comply with the

		provision of Public Procurement (Preference to Make in India) Order, 2017 and as amended time to time by the Department for Promotion of Industry and Internal Trade (DPIIT), Government of India. As compliance to the said order, the Contractor had stated minimum local content as ___ % during the bidding stage, which they must maintain during the execution period. 2. The Contractor shall submit a Local Content Certificate certifying the percentage of local content along with each invoice. 3. Such certificate should be supported by a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of other than companies) giving the percentage of local content. [Only in case the awarded Contract value is more than ₹ 10 Crore]. 4. The percentage of Local Content may vary with each invoice while contractor will have to maintain the overall percentage of local content for the total work/purchase of the pro-rata local content requirement. In case it is not satisfied cumulatively in the invoices raised upto that stage, the Contractor shall indicate how the Local Content requirement would be in the subsequent stages.
5	Terms related to submission of Invoice	Contractor shall submit invoices to the Company after successful completion each milestone. Each invoice shall be supported by a milestone completion document jointly signed by the contractor and OIL or by approval issued by OIL confirming successful completion of the respective milestone.
6	**14.0 <u>Insurance</u>**	1. Employees Compensation Policy or Employers' Liability Policy insurance 2. Commercial General Liability Insurance 3. Comprehensive General Automotive Liability 4. Carrier's Legal Liability Insurance 5. Public Liability Act Policy 6. Pradhan Mantri Suraksha Bima Yojana (PMSBY) 7. Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) 8. Insurance for Equipment & Tools of the Contractor 9. Contractor's All Risk (CAR) Insurance

		In addition to the above, the policies should contain the following: • OIL's name should be mentioned as Principal Insured / Additional Insured in the Policies. • Loss Payee Clause as mentioned in GCC should be mentioned in the policy. • Waiver of subrogation clause as mentioned in GCC should be mentioned in the policy.
7	**30.0 Timely Mobilization and Liquidated Damages**	**LIQUIDATED DAMAGES FOR DELAY IN MOBILIZATION / COMPLETION OF WORKS:** In the event of the Contractor's default in timely mobilization and completion of works within the stipulated period, the Contractor shall be liable to pay liquidated damages @ 0.5% of contract value, per week or part thereof of delay subject to maximum ceiling of 7.5% of contract value.
8	Terms & Provision of Personnel facilities	In addition to the clause of GCC, the bidder shall fulfil the following points: a) All Electrical Works at site shall be carried out by personnels having valid Electrical License only. Copy of Electrical license shall be submitted to OIL while applying gate pass. b) Contractor carrying out the electrical work at site shall possess valid Electrical Contractor License from the appropriate Govt.
9	**23.0 Warranty and remedy of defects**	The warranty and defect liability period (DLP) for the entire project shall be twelve (12) months from the date of successful completion, acceptance, and formal handing over of the project to OIL. Further, **any failure, damage, or defect in any material, equipment, system, or component occurring prior to the successful handing over of the project shall be the sole responsibility of the Contractor**. The Contractor shall promptly repair, rectify, or replace the affected item(s) **free of cost**, including all associated expenses towards dismantling, transportation, loading, unloading, insurance, reinstallation, testing, recommissioning, and any other incidental costs necessary to restore the system to its intended operating condition.
10	***24.0 Subcontracting/Assignment***	Contractor may sub-contract / sublet the site civil construction activity and site installation and testing activity subject to prior approval from OIL. Such

		approval shall not relieve the contractor of any of its obligations under the contract. The contractor shall remain solely and fully responsible for complete execution and timely performance of the service under the contract
11	**GCC Clause No. 39.0** Statutory variation/Newly enacted Law Minimum Wages increment in SCC as the case may be	11.1 The Bidder/Contractor must abide by the following new Labour Codes/notified by Govt. of India on 21.11.2025 and their Rules to be notified: a) The Code on Wages, 2019. b) The Industrial Relations Code, 2020. c) The Code on Social Security, 2020. d) The Occupational Safety, Health and Working Conditions Code, 2020. ii) The Bidder/Contractor shall comply with all provisions stipulated by the Ministry of Labour and Employment vide **D.O. No. Z-20025/13/2019-LRC(E)/e-119357** dated **24.04.2026**. The Bidder/Contractor shall also abide by any other laws/ acts as framed by the Govt. of India from time to time pertaining to the above. 11.2 Contractor shall not engage any person who has attained the age of **60 (sixty) years** as a Contract Labour for execution of the contract. "Contract Labour" shall mean any worker hired in or in connection with the work of an establishment by or through a contractor or sub-contractor, with or without the knowledge of the Principal Employer, as defined under Section 2(m) of the Occupational Safety, Health and Working Conditions Code, 2020.
12	**GCC Clause No. 44.8 Termination for delay in mobilization:**	Notwithstanding anything in the Banning Policy of OIL, in the event of such termination due to the CONTRACTOR's failure to mobilize within the stipulated period, the CONTRACTOR shall, in addition to termination of the Contract, be liable to immediate suspension from participating in any tendering process or entering into any contractual engagement with OIL for a period of three (3) months from the effective date of termination, without prejudice to any other rights or remedies available to OIL under the Contract or applicable law. Note: This Clause is to be read as supplementary to existing GCC Clause No. 44.8 of the tender

13.0 GOODS AND SERVICES TAX:

13.1 In view of GST Implementation from 1st July 2017, all taxes and duties including Excise Duty, CST/VAT, Service tax, Entry Tax and other indirect taxes and duties have been submerged in GST. Accordingly reference of Excise Duty, Service Tax, VAT, Sales Tax, Entry Tax or any other form of indirect tax except of GST mentioned in the bidding document shall be ignored.

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

13.2 "GST" shall mean Goods and Services Tax charged on the supply of material(s) and services. The term "GST" shall be construed to include the Integrated Goods and Services Tax (hereinafter referred to as "IGST") or Central Goods and Services

Tax (hereinafter referred to as "CGST") or State Goods and Services Tax (hereinafter referred to as "SGST") or Union Territory Goods and Services Tax (hereinafter referred to as "UTGST") depending upon the import / interstate or intrastate supplies, as the case may be. It shall also mean GST compensation Cess, if applicable.

13.3 Quoted price/rate(s) should be inclusive of all taxes and duties, except GST (i.e. IGST or CGST and SGST/UTGST applicable in case of interstate supply or intra state supply respectively and cess on GST if applicable) on the final service. However, GST rate (including cess) to be provided in the respective places in the Price Bid .Please note that the responsibility of payment of GST (CGST & SGST or IGST or UTGST) lies with the Supplier of Goods/Services (Service Provider) only. Supplier of Goods/Services (Service Provider) providing taxable service shall issue an Invoice/Bill, as the case may be as per rules/regulation of GST. Further, returns and details required to be filled under GST laws & rules should be timely filed by Supplier of Goods/Services (Service Provider) with requisite details.

13.4 Bidder should also mention the Harmonised System of Nomenclature (HSN) and Service Accounting Codes (SAC) at the designated place in SOR.

13.5 Where the OIL is entitled to avail the input tax credit of GST:

OIL will reimburse the GST to the Supplier of Goods / Services (Service Provider) at actual against submission of Invoices as per format specified in rules/ regulation of GST to enable OIL to claim input tax credit of GST paid. In case of any variation in the executed quantities, the amount on which the GST is applicable shall be modified in same proportion. Returns and details required to be filled under GST laws &rules should be timely filed by supplier with requisite details.

The input tax credit of GST quoted shall be considered for evaluation of bids, as per evaluation criteria of tender document.

13.6 Where the OIL is not entitled to avail/take the full input tax credit of GST:

OIL will reimburse GST to the Supplier of Goods / Services (Service Provider) at actual against submission of Invoices as per format specified in rules/ regulation of GST subject to the ceiling amount of GST as quoted by the bidder. In case of any variation in the executed quantities (If directed and/or certified by the In-Charge) the ceiling amount on which GST is applicable will be modified on pro-rata basis.

The bids will be evaluated based on total price including GST.

13.7 Payments to Service Provider for claiming GST amount will be made provided the above formalities are fulfilled. Further, OIL may seek copies of challan and certificate from Chartered Accountant for deposit of GST collected from OIL.

13.8 Contractor/Contractor shall be required to issue tax invoice in accordance with GST Act and/or Rules so that input credit can be availed by OIL. In the event that the contractor / Contractor fails to provide the invoice in the form and manner prescribed under the GST Act read with GST Invoicing Rules there under, OIL shall not be liable to make any payment on account of GST against such invoice.

13.9 GST shall be paid against receipt of tax invoice and proof of payment of GST to government. In case of non-receipt of tax invoice or non-payment of GST by the contractor/Contractor, OIL shall withhold the payment of GST.

13.10 GST payable under reverse charge mechanism for specified services or goods under GST act or rules, if any, shall not be paid to the contractor/Contractor but will be directly deposited to the government by OIL.

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

13.12 Notwithstanding anything contained anywhere in the Agreement, in the event that the input tax credit of the GST charged by the Contractor / Contractor is denied by the tax authorities to OIL for reasons attributable to Contractor / Contractor, OIL shall be entitled to recover such amount from the Contractor / Contractor by way of adjustment from the next invoice. In addition to the amount of GST, OIL shall also be entitled to recover interest at the rate prescribed under GST Act and penalty, in case any penalty is imposed by the tax authorities on OIL.

13.13 TDS under GST, if applicable, shall be deducted from contractor's/Contractor's bill at applicable rate and a certificate as per rules for tax so deducted shall be provided to the contractor/Contractor.

13.14 The Contractor will be under obligation for charging correct rate of tax as prescribed under the respective tax laws. Further the Contractor shall avail and pass on benefits of all exemptions/concessions available under tax laws. Any error of interpretation of applicability of taxes/ duties by the contractor

shall be to contractor's account.

13.15 It is the responsibility of the bidder to quote the correct GST rate. The classification of goods/services as per GST (Goods & Service Tax) Act should be correctly done by the contractor to ensure that input tax credit on GST (Goods & Service Tax) is not lost to the OIL on account of any error on the part of the contractor.

13.16 In case, the quoted information related to various taxes, duties & levies subsequently proves wrong, incorrect or misleading, OIL will have no liability to reimburse the difference in the duty/tax, if the finally assessed amount is on the higher side and OIL will have to right to recover the difference and in case the rate of duty/taxes finally assessed is on the lower side.

13.17 Notwithstanding anything mentioned elsewhere in the Bidding Document the aggregate liability of OIL towards Payment of Taxes & Duties shall be limited to the volume of GST declared by the bidder in its bid & nothing shall be payable extra except for the statutory variation in taxes & duties.

13.18 Further, it is the responsibility of the bidders to make all possible efforts to make their accounting/IT system GST compliant in order to ensure availability of Input Tax Credit (ITC) to Oil India Ltd.

13.19 GST liability, if any on account of supply of free samples against any tender shall be to bidder's account.

13.20 In case of statutory variation in GST, other than due to change in turnover, payable on the contract value during contract period, the Supplier of Goods/ Services (Service Provider) shall submit a copy of the 'Government Notification' to evidence the rate as applicable on the Bid due date and on the date of revision.

13.21 Beyond the contract period, in case OIL is not entitled for input tax credit of GST, then any increase in the rate of GST beyond the contractual delivery period shall be to Service provider's account whereas any decrease in the rate GST shall be passed on to the OIL.

13.22 Beyond the contract period, in case OIL is entitled for input tax credit of GST, then statutory variation in applicable GST on supply and on incidental services, shall be to OIL's account.

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

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

13.25 The contractor will be liable to ensure to have registered with the respective tax authorities, wherever applicable and to submit self-attested copy of such registration certificate(s) and the Contractor will be responsible for procurement of material in its own registration (GSTIN) and also to issue its

own Road Permit/ E-way Bill, if applicable etc.

13.26 In case the bidder is covered under Composition Scheme under GST laws, then bidder should quote the price inclusive of the GST (CGST & SGST/UTGST or IGST). Further, such bidder should mention "Cover under composition system" in column for GST (CGST & SGST/UTGST or IGST) of price schedule.

13.27 OIL will prefer to deal with registered supplier of goods/services under GST. Therefore, bidders are requested to get themselves registered under GST, if not registered yet. However, in case any unregistered bidder is submitting their

bid, their prices will be loaded with applicable GST while evaluation of bid. Where OIL is entitled for input credit of GST, the same will be considered for evaluation of bid as per evaluation methodology of tender document.

13.28 Procurement of Specific Goods: Earlier, there is no tax incidence in case of import of specified goods (i.e. the goods covered under List-34 of Customs Notification no. 12/2012-Cus dated. 17.03.2012 as amended). Customs duty is not payable as per the policy. However, under GST regime, IGST Plus GST compensation cess (if applicable) would be leviable on such imports. Bidders should quote GST as inclusive considering IGST component for the imported Materials portion while quoting their prices on destination basis. However, GST rate to be specified in the price bid format.

13.29 Documentation requirement for GST

The Contractor will be under the obligation for invoicing correct tax rate of tax/duties as prescribed under the GST law to OIL, and pass on the benefits, if any, after availing input tax credit.

Any invoice issued shall contain the following particulars:

a. Name, address and GSTIN of the supplier;
b. Serial number of the invoice;
c. Date of issue;
d. Name, address and GSTIN or UIN, if registered of the recipient;

OIL'S GSTIN DETAILS	
GSTIN	18AAACO2352C1ZW
Legal Name	OIL INDIA LTD
Trade Name, if any	OIL INDIA LIMITED

e. Name and address of the recipient and the address of the delivery, along with the State and its code,
f. HSN code of goods or Accounting Code of services[SAC];
g. Description of goods or services;
h. Quantity in case of goods and unit or Unique Quantity Code thereof;
i. Total value of supply of goods or services or both;
j. Taxable value of supply of goods or services or both taking into discount or abatement if any;

k. Rate of tax (IGST,CGST, SGST/ UTGST, cess);
l. Amount of tax charged in respect of taxable goods or services (IGST,CGST, SGST/UTGST, cess);
m. Place of supply along with the name of State, in case of supply in the course of interstate trade or commerce;
n. Address of the delivery where the same is different from the place of supply
o. Signature or digital signature of the supplier or his authorised representative.

GST invoice shall be prepared in triplicate, in case of supply of goods, in the following manner:

i. The original copy being marked as ORIGINAL FOR RECIPIENT;
ii. The duplicate copy being marked as DUPLICATE FOR TRANSPORTER
iii. The triplicate copy being marked as TRIPLICATE FOR SUPPLIER.

In case of any advance given against any supplies contract, the supplier of the goods shall issue Receipt Voucher containing the details of advance taken along with particulars as mentioned in clause no. (a), (b), (c), (d), (g), (k), (l), (m) & (o) above.

13.30 Anti-profiteering clause

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

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

14.0 FINANCING OF TRADE RECEIVABLES OF MICRO AND SMALL ENTERPRISES (MSES) THROUGH TRADE RECEIVABLES DISCOUNTING SYSTEM (TREDS) PLATFORM:

14.1 Based on the initiatives of Government of India to help MSE vendors get immediate access to liquid fund based on Buyers credit rating by discounting, OIL has registered itself on TREDS platform with the following entities:

Sl No.	Name of the Authorised Entity	TReDS Payment System
1	A. TReDS Limited	INVOICEMART
2	Receivables Exchange of India Limited (RXIL)	RXIL

3	Mynd Solutions Private Limited	M1xchange
4	C2FO Factor Solutions Private Limited	C2treds
5	KredX Platform Private Limited	DTX

MSE vendors can avail this benefit by registering themselves with any of the exchanges providing e-discounting / electronic factoring services on TReDS platform and following the procedures defined therein, provided OIL is also participating in such TReDS Platform as a Buyer.

14.2 MSE Vendor should be aware that all costs relating to availing the facility of discounting on TReDS platform including but not limited to Registration charges, Transaction charges for financing, Discounting Charges, Interest on financing, or any other charges known by any name shall be borne by MSE Vendor.

14.3 MSE Vendor hereby agrees to indemnify, hold harmless and keep OIL and its affiliates, Directors, officers, representatives, agents and employees indemnified, from any and all damages, losses, claims and liabilities (including legal costs) which may arise from Sellers submission, posting or display, participation, in any manner, on the TREDS Platform or from the use of Services or from the Buyer's breach of any of the terms and conditions of the Usage Terms or of this Agreement and any Applicable Law on a full indemnity basis.

14.4 OIL shall not be liable for any special, indirect, punitive, incidental, or consequential damages or any damages whatsoever (including but not limited to damages for loss of profits or savings, business interruption, loss of information), whether in contract, tort, equity or otherwise or any other damages resulting from using TReDS platform for discounting their (MSE Vendor's) invoices.

Note:

(i) Buyer means OIL, who has placed Purchase Order / Contract on a MSE Vendor (Seller).

(ii) Seller means a MSE vendor, who has been awarded Purchase Order / Contract by OIL (Buyer).

15.0 Sustainable Development and Environment, Social & Governance Policy:

Consequent to the implementation of Sustainable Development (SD) and Environment, Social & Governance (ESG) Policy of OIL, effective from 28.08.2024, the successful bidder shall be required to submit a duly filled ESG Questionnaire in the prescribed format within 15 (fifteen) days from the date of award of contract or issue of purchase order. Failure to submit the completed ESG Questionnaire within the stipulated timeline may be treated as non-compliance with contractual obligations and dealt with accordingly.

The ESG Questionnaire along with Explanatory Note for guidance, is provided as **Appendix-VII** of the tender document.

Table B: Other Clauses

1	Details of the Service	Construction of Grid Power Receiving-end Infrastructure at Moran Power Station premises to step down from 33 kV (grid Voltage) to 11 kV Voltage level for Integration into OIL's electrical Network on LSTK basis
2	Area of Operation	Moran Power Station, OIL, Moran
3	**HSE Policy**	In addition to clause no 37.0 of GCC, the contractor is also advised to refer **Proforma-XX** for details of HSE points which are applicable to Power Station only.
4	Association of company's Personnel	Applicable.
5	Maintaining Hindrance Register	**As per Proforma-XXIII**
7	Notice	Any notice given by one party to other, pursuant to this Contract shall be sent in writing or by e-mail to the applicable address specified below: **Company** a) **For contractual matters** CGM (Contracts) OIL INDIA LIMITED PO DULIAJAN - 786602 ASSAM, INDIA Phone No. 91-374-2808650 Email: contracts@oilindia.in b) **For technical matters** **CGM-Electrical (HoD)** Oil India Limited, P.O. Duliajan-786602 Dist. Dibrugarh, Assam. Phone No. 91-374- 280 Email: c) **Contractor** _____ A notice shall be effective when delivered or on the notice's effective date, whichever is later.

8	Address details for submission of invoice	All Invoices are to be sent to the following address: **CGM-Electrical (HoD)** Oil India Limited, P.O. Duliajan-786602 Dist. Dibrugarh, Assam
9	Training and Certification obligation of contractors	All personnel deployed by the contractor shall undergo the requisite training on the following, but not limited to: (i) First Aid. (ii) Permit To Work including isolation/LOTO and hot works; Fire Safety & Firefighting basic, emergency response drills. iii) Working at Height, Confined space entry, Lifting & Rigging/Scaffolding, Electrical Safety, PPE selection/Use, Manual handling as applicable to job roles. iv) Medical Fitness Certificate.

****

SECTION-IV

SCHEDULE OF RATES -(SOR)/ SCHEDULE OF QUANTITES (SOQ)

A. Description: Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis.

Sl No	Short Description	Unit of Measurement (A)	QTY
1	Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis.	Lumsum	01

B. Price Breakup of Major Components

Item No.	Description of Services	UOM	Estimated Quantity	Rate (Rs.) to be quoted Excluding GST	Amount (Rs.) Excluding GST
			A	B	C = A * B
10	33 KV Switchboard	No.	1.00		-
20	11 KV Switchboard	No.	1.00		-
30	33/11 KV, 5 MVA Transformer	No.	1.00		-
40	Nitrogen Injected Fire Suppression System (NIFPS)	Set	2.00		-
50	11KV / 433 V, 500 KVA Transformer	No.	2.00		-
60	LT System	Set	1.00		-
70	Grid Synchronization Control Panel	No.	1.00		-
80	Sub Station Automation (SAS) System	Set	1.00		-
90	Asset Monitoring System (AMS)	Set	1.00		-
100	Energy Management System (EMS)	Set	1.00		-

110	Automatic Power Factor Correction Panel	No.	1.00		-
120	UPS, Battery Charger and Battery Banks	Set	1.00		-
130	Illumination System	Lumsum	1.00		-
140	HT Cable	Lumsum	1.00		-
150	LT Cable	Lumsum	1.00		-
160	CC TV	Lumsum	1.00		-
170	E-House	No.	2.00		-
180	Rooftop Solar Plant	Lumsum	1.00		-
190	Fire Detection and Protection System in E-House	Lumsum	1.00		-
200	Air Conditioner in E-House	Lumsum	1.00		-
210	Numerical Relay - 33 KV and 11 KV Switchboard	Lumsum	1.00		-
220	Trivector Meter	Lumsum	1.00		-
230	Earthing System & Lightning Arrestor and Surge counter	Lumsum	1.00		-
240	Installation and commissioning charge of the project	Lumsum	1.00		-
250	Any other materials	Lumsum	1.00		-

Note: Any item, equipment, material, accessory or service required for the successful completion of the project, whether or not specifically mentioned in the tender documents, shall be deemed to be included in the bidder's scope of work at no additional cost to Owner i.e. OIL.

Payment Schedule

Milestone Based Payment

Sr. No	Milestone	Payment	Remarks
1	Approval of Basic Engineering a) Design Basis b) Single Line Diagram (SLD) c) Layout Plan d) Protection and Control e) Earthing and Lightning Protection	5% of SOR	Approval Copy /Jointly Signed Document
2	Approval of Detailed Engineering a) 33 KV Switchboard in E-House b) 11 KV Switchboard in E-House c) Grid synchronization Scheme d) Sub Station Automation Scheme e) Civil Foundation	5% of SOR	Approval Copy /Jointly Signed Document
3	Completion of civil works for equipment foundations as per layout plan	10 % of SOR	Jointly signed document
4	Receipt of all major components at site as per approved layout plan	40 % of SOR	Material Receipt Certificate (Jointly signed)
5	Completion of erection of all equipment	15 % of SOR	Jointly signed document
6	Completion of cable laying and terminations	5 % of SOR	Jointly signed document
7	Successful testing & commissioning of electrical equipment	10 % of SOR	Jointly signed document
8	Plant Commissioning (48 hrs operation)	8 % of SOR	Jointly signed document
9	Plant Hand Over	2 % of SOR	Jointly signed document

PROFORMA-I

BID FORM

To
M/s OIL INDIA LIMITED,
P.O. Duliajan, Assam, India

Sub: IFB No. **CDI251327** for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."**

Gentlemen,

Having examined the General and Special Terms & Conditions of Contract and the Terms of Reference including all attachments thereto, the receipt of which is hereby duly acknowledged, we the undersigned offer to perform the work / services in conformity with the said conditions of Contract and Terms of Reference for the sum quoted in our bid.

We undertake, if our Bid is accepted, to commence the work as per the terms & conditions set out in the subject tender.

If our Bid is accepted, we will submit the Performance Security Deposit as specified in the tender document for the due performance of the Contract.

We agree to abide by this Bid for a period of **120 (One Hundred Twenty) days** from the date of Bid closing and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal Contract is prepared and executed, this Bid, together with your written acceptance thereof in your notification of award shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this _____ day of _____ 2026.

Authorised Person's Signature: _____

Name: _____

Designation: _____

Seal of the Bidder:

PROFORMA-II

STATEMENT OF NON-COMPLIANCE (IF ANY)

(Only exceptions/deviations to be rendered)

1.0 The Bidder shall furnish detailed statement of **exceptions / deviations**, if any, to the IFB stipulations, terms and conditions in respect of each Section of Bid Document in the following format:

Section No.	Clause No. (Page No.)	Non-Compliance	Remarks

Signature of Bidder: _____

Name: _____

NOTE: OIL INDIA LIMITED expects the bidders to fully accept the terms and conditions of the bid document. However, should the bidders still envisage some exceptions/deviations to the terms and conditions of the bid document, the same should be indicated as per above format and submit along with their bids. If the "**Statement of Non-Compliance**" in the above Proforma is left blank (or not submitted along with the Bid), then it would be construed that the bidder has not taken any exception/deviation to the IFB requirements.

PROFORMA-III

PROFORMA LETTER OF AUTHORISATION FOR ATTENDING BID OPENING

To,
CGM-CONTRACTS (HoD)
Contracts Department
P.O. DULIAJAN-786602
Assam, India

Sir,

I/We _____ confirm that Mr. _____ (Name and address) as authorised to represent us during bid opening on our behalf with you against the **IFB No. CDI251327** for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."**

Yours faithfully,

Authorised Person's Signature: _____

Name: _____

Signature of Bidder: _____

Name: _____

Date: _____

PROFORMA-IV

PROFORMA FOR LETTER OF AUTHORITY

To,
CGM-CONTRACTS (HoD)
Contracts Department
P.O. Duliajan PIN-786602
Dist. Dibrugarh, Assam, India

Dear Sir,

We, _____ of _____ confirm that Mr./Mrs./Ms. _____ _____ (Name and Address) is authorised to represent us to Bid, negotiate and conclude the agreement on our behalf with you against **IFB No. CDI251327** for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."** for any commercial / Legal purpose etc.

We confirm that we shall be bound by all and whatsoever our said representative shall commit.

Authorised Person's Signature: _____

Name: _____

Yours faithfully,

Signature: _____

Name & Designation _____

For & on behalf of _____

NOTE: This letter of authority shall be on printed letter head of the bidder and shall be signed by a person competent and having the power of attorney (Power of attorney shall be annexed) to bind such Bidder.

PROFORMA-V

[TO BE FILLED-UP / SUBMITTED BY THE VENDOR ON ITS LETTER HEAD FOR E-REMITTANCE]

Name:

FULL Address:

Phone Number:

Mobile Number:

E-mail address:

Fax Number:

Bank Account Number (in which the Bidder wants remittance against invoices):

Bank Name:

Branch:

Address of the Bank:

Bank Code:

IFSC/RTGS Code of the Bank:

NEFT Code of the Bank:

PAN Number:

GST Registration Number:

_____

Signature of Bidder with Official Seal

PROFORMA-VI

CERTIFICATE OF ANNUAL TURNOVER & NET WORTH

TO BE ISSUED BY PRACTISING **CHARTERED ACCOUNTANTS' FIRM** ON THEIR LETTER HEAD

TO WHOM IT MAY CONCERN

This is to certify that the following financial positions extracted from the audited financial statements of M/s..... (Name of the Bidder) for the last three (3) completed accounting years up to ..... **(as the case may be)** are correct.

YEAR	**TURN OVER** In INR (Rs.) Crores	**NET WORTH** In INR (Rs.) Crores

Annual Financial Turnover of the bidder from operations shall mean: "Aggregate value of the realization of amount made from the sale, supply or distribution of goods or on account of services rendered, or both, by the company (bidder) during a financial year" as per the Companies Act, 2013 Section 2 (91).

Net worth shall mean: "Share capital + Reserves created out of profits and securities Premium – Aggregate value of accumulated losses (excluding revaluation reserves) – deferred expenditure – Miscellaneous Expenditure to the extent not written off and carried forward Loss - Reserves created out of write back of depreciation and amalgamation".

Place:

Date:

UDIN:

Seal:

Membership Code & Registration No.:

Signature

PROFORMA-VII

(TO BE EXECUTED BY THE AUTHORIZED SIGNATORY OF THE BIDDER ON THE OFFICIAL LETTER HEAD OF THE BIDDER)

CERTIFICATE OF COMPLIANCE TO FINANCIAL CRITERIA

Ref.: Note 'B.' under Notes to BEC Clause No. 5.0, Financial Criteria of the BEC/ PQC

I _____ the authorized signatory(s) of _____ (Company or Firm name with address) do hereby solemnly affirm and declare/ undertake as under:

The balance sheet / Financial Statements for the financial year _____ have actually not been audited as on the Original Bid Closing Date.

Yours faithfully,

For (type name of the firm here)

Signature of Authorized Signatory

Name:

Designation:

Phone No.

Place:

Date:

(Affix Seal of the Organization here, if applicable)

Note: This certificate is to be issued only considering the time required for preparation of Financial Statements i.e. if the last date of preceding financial / accounting year falls within the preceding six months reckoned from the Original Bid Closing Date.

PROFORMA-VIII

FORM OF BID SECURITY (BANK GUARANTEE FORMAT)

To:
M/s OIL INDIA LIMITED,
CONTRACTS DEPARTMENT,
DULIAJAN, ASSAM, INDIA, PIN – 786602

WHEREAS, (Name of Bidder) _____ (hereinafter called "the Bidder") has submitted their offer Dated _____ for the provision of certain services (hereinafter called "the Bid") against OIL INDIA LIMITED, Duliajan, Assam, India (hereinafter called the Company)'s Tender No. _____ KNOW ALL MEN BY these presents that we (Name of Bank) _____ of (Name of Country) _____ having our registered office at _____ (hereinafter called "Bank") are bound unto the Company in the sum of (*_____) for which payment well and truly to be made to Company, the Bank binds itself, its successors and assignees by these presents.

SEALED with the said Bank this ___ day of _____ 20_____.

THE CONDITIONS of these obligations are:

1. If the Bidder withdraws their Bid within its original/extended validity; or
2. The Bidder modifies/revises their bid suo moto; or
3. The Bidder does not accept the contract; or
4. The Bidder does not furnish Performance Security Deposit within the stipulated time as per tender/contract; or
5. If it is established that the Bidder has submitted fraudulent documents or has indulged into corrupt and fraudulent practice.

We undertake to pay to Company up to the above amount upon receipt of its first written demand (by way of letter/fax/cable), without Company having to substantiate its demand provided that in its demand Company will note that the amount claimed by it is due to it owing to the occurrence of any of the conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including the date (**--/--/--) and any demand in respect thereof should reach the Bank not later than the above date.

The details of the Issuing Bank and Controlling Bank are as under:

A. Issuing Bank:

BANK FAX NO:
BANK EMAIL ID:
BANK TELEPHONE NO.:
IFSC CODE OF THE BANK:

B. Controlling Office:

Address of the Controlling Office of the BG issuing Bank:

Name of the Contact Person at the Controlling Office with Mobile No. and e-mail address:

Contd.....P/2
PROFORMA-VIII

Notwithstanding anything contained herein:

a) Our liability under this Bank Guarantee shall is restricted up to Rs……..

b) This guarantee shall be valid till ……..

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before ……. (Date of Expiry of BG PLUS one year claim period).

d) At the end of the claim period that is on or after ……. (Date of expiry of the Bank Guarantee Plus Minimum of 1 year claim period shall be stipulated) all your rights under this Guarantee shall stand extinguished and we shall be discharged from all our liabilities under this Guarantee irrespective of receipt of original Bank Guarantee duly discharged, by Bank.

Name of the Contact Person at the Controlling Office with Mobile No. and e-mail address:

a) SIGNATURE AND SEAL OF THE GUARANTORS_____
b) Designation_____
c) Name of the Bank_____
d) Address_____

Note:

***** The Bidder should insert the amount of the guarantee in words and figures.

****** Date of expiry of Bank Guarantee should be minimum 30 days after the end of the validity period of the Bid/as specified in the Tender.

******* The Bank Guarantee issuing bank branch shall ensure the following:

a. The Bank Guarantee issued by the Bank must be routed through SFMS platform as per following details:

   (i) MT 760/ MT 760 COV for issuance of Bank Guarantee
   (ii) MT 760/ MT 767 COV for amendment of Bank Guarantee

   The above message / intimation shall be sent through SFMS (indicating the Contract Number) by the BG issuing bank branch to ICICI BANK, Duliajan Branch; IFSC Code – ICIC0000213; SWIFT Code – ICICINBBXXX; Branch Address: ICICI Bank Ltd., Kunja Bhavan, Daily Bazaar, Duliajan, Dibrugarh, Assam -786602.

b. Bank Guarantee issued by a Scheduled Bank in India at the request of some other Non-Scheduled Bank of India shall not be acceptable.

c. Further correspondence against BG towards Bid Security must contain the Tender Number.

PROFORMA OF "INSURANCE SURETY BOND" FOR "BID SECURITY"

(To be stamped in accordance with the Stamp Act)

To **M/s OIL INDIA LIMITED,** **Address: DULIAJAN, DIBRUGARH, ASSAM** **PIN-786602**	**Insurance Surety Bond (ISB) No.**	
	Date of ISB	
	ISB Valid up to (Expiry date)	
	Claim period up to (indicate date of expiry of claim period which includes minimum three months from the expiry date)	
	Stamp Sl. No./e-Stamp Certificate No.	

WHEREAS, (Name of Bidder) _____ (hereinafter called "the Bidder") has submitted their offer Dated _____ for the provision of certain services (hereinafter called "the Bid") against OIL INDIA LIMITED, Duliajan, Assam, India (hereinafter called the Company's) Tender No. _____ KNOW ALL MEN BY these presents that we _____ (Name & address of the "Insurer") _____ having our registered office at _____ (hereinafter called " Insurer "), its successors and assignees, unconditionally and irrevocably undertake to pay forthwith to the Company an amount of Rs. .....(Rupees ..... only) (hereinafter referred to as the "Surety Bond") as our primary obligation without any demur, reservation, recourse, contest or protest and without reference to the Bidder, if the Bidder shall fail to fulfil or comply with all or any of the conditions mentioned below or referred in the Tender document in this regards.

Any such written demand made by the Company stating that the Bidder is in default of the due and faithful fulfilment and compliance with the aforesaid conditions shall be final, conclusive and binding on the Surety Insurer.

SEALED with the said Insurer this ___ day of _____ 20_____

THE CONDITIONS of these obligations are:

1. If the Bidder withdraws their Bid within its original/extended validity; or
2. The Bidder modifies/revises their bid suomoto; or
3. The Bidder does not accept the contract; or
4. The Bidder does not furnish Performance Security Deposit within the stipulated time as per tender/contract; or
5. If it is established that the Bidder has submitted fraudulent documents or has indulged into corrupt and fraudulent practice.

NOW, THEREFORE, the Surety Insurer hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Surety Bond shall not be affected by any change in the constitution or winding up of the Bidder or the Surety Insurer or any absorption, merger or amalgamation of the Bidder or the Surely Insurer with any other person.

2. In order to give full effect to this Surety Bond, the Company shall be entitled to treat the Surety Insurer as the principal debtor.

3. The Surety Insurer declares that it has the power to issue this Surety Bond and discharge the obligations contemplated herein, the undersigned is duly authorised and has full power to execute this Surety Bond for and on behalf of the Surety Insurer.

4. Notwithstanding anything contained herein:

   a) The Insurer's liability under this Insurance Surety Bond shall not exceed (currency in figures) . . . . . (currency in words only) . . . . .

   b) This Insurance Surety Bond shall remain in force upto _____ and any extension(s) thereof; and

   c) The Surety insurer shall be released and discharged from all liability under this Insurance Surety Bond unless a written claim or demand is issued to the insurer on or before the midnight of .....(indicate date of expiry of claim period which includes minimum **three months** from the expiry of this Insurance Surety Bond) and any extension(s) thereof. If a claim has been received by us within the said date, all the rights of Company under this Insurance Surety Bond shall be valid and shall not cease until we have satisfied that claim.

In witness whereof the insurer, through its authorized officer, has set its hand and stamp on this _____day of _____ 20__ at _____.

Witness:	**Issuing Authority:**
.....	.....
(Signature)	(Signature of the Authorised Signatory)
.....	.....
(Name)	(Name)
.....	.....
(Designation & official address)	(Designation with Insurer Stamp)

Authorised Vide
Power of Attorney No.....
Date.....

PROFORMA-X

BID SECURITY DECLARATION

(To be submitted on Bidder's letter head in case bidder is exempted from Bid Security/EMD)

To,
CGM-CONTRACTS (HOD)
OIL INDIA LIMITED
P.O. DULIAJAN – 786602
Assam, India

Sub: IFB No. CDI251327 for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."**

1.0 I/We understand that, according to your Tender conditions, bids must be supported by a 'Bid Security' in the form of a 'Bid-Securing Declaration'.

2.0 I/We the undersigned hereby declare that if we withdraw or modify our Bids during the period of its validity, or if we are awarded the contract and fail to sign the contract, or we fail to submit performance security before the deadline defined in the Tender document; we will be suspended for the period of two years. This suspension of two years shall be automatic without conducting any enquiry.

For M/s _____ (name of the firm here)

Signature of Authorized Signatory

Name: _____

Designation: _____

Phone No.: _____

Place: _____

Date: _____

(Affix Seal of the Organization here, if applicable)

PROFORMA-XI

Format of undertaking by Bidders towards submission of authentic information/documents (To be typed on the letter head of the bidder)

Ref. No. _____ Date _____

To,
CGM-Contracts (HoD)
Contracts Department,
OIL, Duliajan

Sub: Undertaking of authenticity of information / documents submitted

Ref.: Your **IFB No. CDI251327** for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."**

Sir,

With reference to our quotation against your above-referred tender, we hereby undertake that no fraudulent information/documents have been submitted by us.

We take full responsibility for the submission of authentic information/documents against the above cited bid.

We also agree that, during any stage of the tender/contract agreement, in case any of the information/documents submitted by us are found to be false/forged/ fraudulent, OIL has right to reject our bid at any stage including forfeiture of our EMD and/or PBG and/or cancel the award of contract and/or carry out any other penal action on us, as deemed fit.

Yours faithfully,

For (type name of the firm here)

Signature of Authorized Signatory

Name:

Designation:

Phone No.

Place:

Date:

(Affix Seal of the Organization here, if applicable)

PROFORMA-XII

FORMAT OF PERFORMANCE BANK GUARANTEE

(TO BE FURNISHED BY THE CONTRACTOR IN CASE OF SUBMITTING PERFORMANCE SECURITY IN THE FORM OF BANK GUARANTEE AFTER ISSUE OF LOA)

To,
M/s. OIL INDIA LIMITED,
CONTRACTS DEPARTMENT
DULIAJAN, ASSAM, INDIA, PIN - 786602

WHEREAS _____ (Name and address of Contractor) (hereinafter called "Contractor") had undertaken, in pursuance of Contract No. _____ to execute (Name of Contract and Brief Description of the Work) _____ (hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee as security for compliance with Contractor's obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee; NOW THEREFORE we hereby affirm that we are Guarantors on behalf of the Contractor, up to a total of (Amount of Guarantee in figures) _____ (in words _____), such amount being payable in the types and proportions of currencies in which the Contract price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of guarantee sum as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein. We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or the work to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way cease us from any liability under this guarantee, and we hereby waive notice of such change, addition or modification.

This guarantee is valid until the _____day of _____

The details of the Issuing Bank and Controlling Bank are as under:

A. Issuing Bank:
BANK FAX NO:
BANK EMAIL ID:
BANK TELEPHONE NO.:
IFSC CODE OF THE BANK:

B. Controlling Office:

Address of the Controlling Office of the BG issuing Bank:

Name of the Contact Person at the Controlling Office with Mobile No. and e-mail address:

Contd.....P/2
PROFORMA-XII

Notwithstanding anything contained herein:

a) Our liability under this Bank Guarantee shall is restricted up to Rs……..

b) This guarantee shall be valid till ……..

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before …… (Date of Expiry of BG PLUS one year claim period).

d) At the end of the claim period that is on or after ……. (Date of expiry of the Bank Guarantee Plus Minimum of 1 year claim period shall be stipulated) all your rights under this Guarantee shall stand extinguished and we shall be discharged from all our liabilities under this Guarantee irrespective of receipt of original Bank Guarantee duly discharged, by Bank.

Name of the Contact Person at the Controlling Office with Mobile No. and e-mail address:

a) SIGNATURE AND SEAL OF THE GUARANTORS_____
b) Designation_____
c) Name of the Bank_____
d) Address_____

Note:

***** The Bidder should insert the amount of the guarantee in words and figures.

****** Date of expiry of Bank Guarantee should be minimum 30 days after the end of the validity period of the Bid/as specified in the Tender.

******* The Bank Guarantee issuing bank branch shall ensure the following:

a. The Bank Guarantee issued by the Bank must be routed through SFMS platform as per following details:

(iii) MT 760/ MT 760 COV for issuance of Bank Guarantee
(iv) MT 760/ MT 767 COV for amendment of Bank Guarantee

The above message / intimation shall be sent through SFMS (indicating the Contract Number) by the BG issuing bank branch to ICICI BANK, Duliajan Branch; IFSC Code – ICIC0000213; SWIFT Code – ICICINBBXXX; Branch Address: ICICI Bank Ltd., Kunja Bhavan, Daily Bazaar, Duliajan, Dibrugarh, Assam -786602.

b. Bank Guarantee issued by a Scheduled Bank in India at the request of some other Non-Scheduled Bank of India shall not be acceptable.

c. Further correspondence against BG towards Performance Security must contain the Contract Number.

PROFORMA-XIII

UNDERTAKING BY VENDOR ON SUBMISSION OF BANK GUARANTEE

To,
Oil India Limited
Contracts Department
Duliajan, Assam - 786602

We, M/s..... are submitting the Bid Security/ Performance Security (strike out whichever not applicable) in favour of Oil India Limited, Duliajan in the form of bank guarantee bearing Reference No. .....for an amount of INR..... valid up to ..... as per terms and conditions of Tender / Contract No. .....

BG issuing bank details:

Bank: Branch: IFS Code:	
Contact Details E-mail Addresses:	Mobile No.: Telephone No.: Fax No.:
Correspondence Address H No/Street/City:	State: Country: Pin Code:

Declaration:

We have arranged to send the confirmation of issuance of the bank guarantee via SFMS portal through our bank using the details mentioned in the tender and hereby confirming the correctness of the details mentioned.

Authorized Signature: _____
Name: _____
Vendor Code: _____
Email ID: _____
Mobile No.: _____

Enclosure: Original bank guarantee

PROFORMA-XIV

Declaration by the vendor/party for confirmation of Term deposit/Fixed Deposit from the issuing bank

To,
M/s Oil India Limited,
P.O. Duliajan, Assam, India

Sub: **Tender/Contract No. .....**

Full address of the issuing bank	:	
Branch Code	:	
Authorised signatory with full name and designation	:	
Phone (Mobile) Numbers of the branch	:	
Email address of the branch	:	
Such fixed/term deposit must be pledged in favour of OIL and it must in the printed form on the physical original FDR in words "Pledged in favour of Oil India Limited"	:	

Authorised Person's Signature: _____

Name: _____

Designation: _____

Seal of the Bank:

PROFORMA-XV

PROFORMA OF "INSURANCE SURETY BOND" FOR "PERFORMANCE SECURITY"

(To be stamped in accordance with the Stamp Act)

To **M/s OIL INDIA LIMITED,** **Address: DULIAJAN, DIBRUGARH, ASSAM** **PIN-786602**	**Insurance Surety Bond (ISB) No.**	
	Date of ISB	
	ISB Valid up to (Expiry date)	
	Claim period up to (indicate date of expiry of claim period which includes minimum three months from the expiry date)	
	Stamp Sl. No./e-Stamp Certificate No.	

WHEREAS, (Name and address of Contractor) _____ (hereinafter called "Contractor") had undertaken, in pursuance of Contact No. _____ to execute (Name of Contract and Brief Description of the Work) _____ (hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with an Insurance Surety Bond (ISB) as security for compliance with Contractor's obligations in accordance with the Contract.

AND WHEREAS we (May incorporate the Insurer) have agreed to give the Contractor such an Insurance Surety Bond; NOW THEREFORE we hereby affirm that we are Insurer on behalf of the Contractor, up to a total of (Amount of ISB in figures) _____ (in words_____), such amount being payable in the types and proportions of currencies in which the Contract price is payable, and we, undertake to pay you, upon your first written demand stating the default/breach committed by the Contractor without cavil or arguments, any sum or sums within the limits of guarantee sum as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein. We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or the work to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way cease us from any liability under this ISB, and we hereby waive notice of such change, addition or modification.

NOW, THEREFORE, the Surety Insurer hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Surety Bond shall not be affected by any change in the constitution or winding up of the Contractor or the Surety Insurer or any absorption, merger or amalgamation of the Contractor or the Surely Insurer with any other person.

2. In order to give full effect to this Surety Bond, the Company shall be entitled to treat the Surety Insurer as the principal debtor.

3. The Surety Insurer declares that it has the power to issue this Surety Bond and discharge the obligations contemplated herein, the undersigned is duly authorised and has full power to execute this Surety Bond for and on behalf of the Surety Insurer.

4. Notwithstanding anything contained herein:

   a) The Insurer's liability under this Insurance Surety Bond shall not exceed (currency in figures) . . . . . (currency in words only) . . . . .

   b) This Insurance Surety Bond shall remain in force upto _____ and any extension(s) thereof; and

   c) The Surety insurer shall be released and discharged from all liability under this Insurance Surety Bond unless a written claim or demand is issued to the insurer on or before the midnight of .....(indicate date of expiry of claim period which includes minimum **three months** from the expiry of this Insurance Surety Bond) and any extension(s) thereof. If a claim has been received by us within the said date, all the rights of Company under this Insurance Surety Bond shall be valid and shall not cease until we have satisfied that claim.

In witness whereof the insurer, through its authorized officer, has set its hand and stamp on this _____day of _____ 20__ at _____.

Witness:	**Issuing Authority:**
.....	.....
(Signature)	(Signature of the Authorised Signatory)
.....	.....
(Name)	(Name)
.....	.....
(Designation & official address)	(Designation with Insurer Stamp)

Authorised Vide
Power of Attorney No.....
Date.....

PROFORMA-XVI

UNDERTAKING REGARDING NON-INCLUSION OF HAZARDOUS SUBSTANCES

[as per GCC Clause No. 14.12 (v)]

[On company's Letter Head]

To,
M/s OIL INDIA LIMITED,
CONTRACTS DEPARTMENT,
DULIAJAN, ASSAM, INDIA, PIN-786602

Dear Sir,

This has reference to your IFB No. **CDI251327** Dated ..... 20___ on the subject .....

We..... (Name of the Company) confirm that no hazardous substance as stipulated in the Public Liability Insurance Act 1991 and the Rules framed thereunder will be handled during the performance of the aforesaid Tender/Contract.

It is hereby also confirmed that we will hold OIL harmless in case of any claim on us under the Public Liability Act Policy covering the statutory liability arising out of accidents occurring during the currency of the contract due to handling hazardous substances as provided in the Public Liability Insurance Act 1991 and the Rules framed thereunder.

Signature

(Name & Designation of Authorized person)

PROFORMA-XVII

UNDERTAKING FOR LOCAL CONTENT

(To be submitted in the letter head of the bidder)

Ref. No. _____ Date _____

To,
CGM- CONTRACTS (HoD)
Contracts Department,
OIL, Duliajan

Dear Sir,

We, _____ (Name of the bidder) have submitted Bid against IFB No. **CDI251327** dated _____ for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."**

We hereby undertake that we meet the mandatory minimum local content requirement as mandated by Public Procurement (Preference to Make in India) Order, 2017 of Department for Promotion of Industry and Internal Trade (DPIIT), Govt. of India as revised vide Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 (and as amended time to time) with modifications as notified vide MoPNG Order No. FP-20013/2/2017-FP-PNG-Part (4) (E-41432) dated 26th April 2022 (including subsequent amendments thereof, if any). The percentage of Local Content is _____ %.

We further declare that the percentage of Local content for the tendered Goods/Services has been calculated in conjunction with the directive issue by Ministry of Petroleum and Natural Gas vide notification no. **FP-20013/2/2017-FP-PNG-Part (4) (E-41432)** dated **26.03.2024.**

For and on behalf of _____

Authorized signatory _____

Name _____

Designation _____

Contact No. _____

PROFORMA-XVIII

MOBILIZATION COMPLETION CERIFICATE

(to be issued on completion of mobilization)

Ref. No. **Date:**

1.0 Contract No. & Date:

2.0 Letter of Award (LOA) with Ref. No. & Date:

3.0 Name of the Contractor:

4.0 Description of Services:

5.0 Mobilization Period:

6.0 Mobilization Notice with Ref. No. & Date:

7.0 Schedule Date of Completion of Mobilization:

8.0 Actual Date of Completion of Mobilization:

9.0 Any other information:

It is hereby certified that the above Mobilization activities have been completed in all respects in accordance with the scope, terms and conditions of the contract/ Mobilization Notice.

For OIL INDIA LIMITED,

(Signatory of User Department)

Signatory Name: .....

Designation: .....

Department: .....

PROFORMA-XIX

INTEGRITY PACT (IP)

Between

Oil India Limited (OIL) hereinafter referred to as "The Principal"

And

(Name of the bidder).....hereinafter referred to as "The Bidder"

Preamble:

The Principal intends to award, under laid down organizational procedures, contract/s for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."**

The Principal values full compliance with all relevant laws and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder/s.

In order to achieve these goals, the Principal cooperates with the renowned international Non-Governmental Organization "Transparency International" (TI). Following TI's national and international experience, the Principal will appoint an external independent Monitor who will monitor the tender process for compliance with the principles mentioned above.

Section 1 - Commitments of the Principal

1. The Principal commits itself to take all measures necessary to prevent Corruption and to observe the following principles:

   I. No employee of the Principal, personally or through family members, will in connection with the tender for, or during execution of a contract, demand, take a promise for or accept, for him/herself or third person, any material or immaterial benefit which he/she is not legally entitled to.

   II. The Principal will, during the tender process treat all Bidders with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidders the same information and will not provide to any Bidder confidential/additional information through which the Bidder could obtain an advantage in relation to the tender process.

   III. The Principal will exclude from the process all known prejudiced persons.

2. If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the relevant Anti-Corruption Laws of India, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officers and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder

1. The Bidder commits itself to take all measures necessary to prevent corruption. During his participation in the tender process, the Bidder commits himself to observe the following principles:

   I. The Bidder will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or immaterial benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during subsequent contract execution, if awarded.

   II. The Bidder will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, Subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

   III. The Bidder(s) will not commit any offence under the relevant Anticorruption Laws of India, further, the Bidder(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

   IV. The Bidder will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

   V. Bidders to disclose any transgressions with any other public/government organization that may impinge on the anti-corruption principle. The date of such transgression, for the purpose of disclosure by the bidders in this regard, would be the date on which cognizance of the said transgression was taken by the competent authority. The period for which such transgressions (s) is/are to be reported by the bidders shall be the last **three years** to be reckoned from date of bid submission. The transgression (s), for which cognizance was taken even before the said period of three years, but are pending conclusion, shall also be reported by the bidders.

   VI. The Bidder(s) of foreign origin shall disclose the name and address of the Agents/ representatives in India, if any. Similarly, the Bidder(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further, all the payments made to the Indian agent/ representative have to be in India Rupees only.

   VII. Bidders not to pass any information provided by Principal as part of business relationship to others and not to commit any offence under PC/ IPC Act;

2. The Bidder will not instigate third persons to commit offences outlined above or be an accessory to such offences.

3. The Bidder signing Integrity Pact shall not approach the Courts while representing the matters to IEMs and he/she will await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future Contracts

If the Bidder, before contract award has committed a transgression through a violation of Section 2 or in any other form such as to put his reliability or risibility as Bidder into question, the Principal is entitled to disqualify the Bidder from the tender process, for such reason.

1. If the Bidder has committed a transgression through a violation of Section 2 such as to put his reliability or credibility into question, the Principal is entitled also to exclude the Bidder from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of the transgression. The severity will be determined by the circumstances of the case, in particular the number of transgressions, the position of the transgressions within the company hierarchy of the Bidder and the amount of the damage. The exclusion will be imposed for a minimum of 6 months and maximum of 2 years.

2. The Bidder accepts and undertakes to respect and uphold the Principal's Absolute right to resort to and impose such exclusion and further accepts and undertakes not to challenge or question such exclusion on any ground, including the lack of any hearing before the decision to resort to such exclusion is taken. This undertaking is given freely and after obtaining independent legal advice.

3. If the Bidder can prove that he has restored/recouped the Damage caused by him and has installed a suitable corruption prevention system, the Principal may revoke the exclusion prematurely.

4. A transgression is considered to have occurred if in light of available evidence, no reasonable doubt is possible.

5. Integrity Pact, in respect of a particular contract, shall be operative from the date Integrity Pact is signed by both the parties or as mentioned in Section 9 - Pact Duration whichever is later. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.

Section 4 - Compensation for Damages

1. If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover from the Bidder liquidated damages equivalent to Earnest Money Deposit / Bid Security.

2. If bidder agrees and undertakes to pay the said amounts without protest or demur subject only to condition that if the Bidder can prove and establish that the exclusion of the Bidder from the tender process has caused no damage or less damage than the amount or the liquidated damages, the Bidder shall compensate the Principal only to the extent of the damage in the amount proved.

Section 5 - Previous transgression

1. The Bidder declares that no previous transgression occurred in the last 3 years with any other company in any country conforming to the TI approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

2. If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process for such reason.

Section 6 - Equal treatment of all Bidders/Contractor/Subcontractors

1. The Principal will enter into Pacts on identical terms with all bidders.

2. The Bidder undertake(s) to procure from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder shall be responsible for any violation(s) of the provisions laid down in this agreement/Pact by any of its sub-contractors/sub-vendors.

3. The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 - Criminal charges against violating Bidders/Contractors/Subcontractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor, which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 - External Independent Monitor/Monitors

1. The Principal appoints competent and credible Independent External Monitor (IEM) for this Pact.

2. The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the Chairperson of the Board of the Principal.

3. The Bidder accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Bidder. The Bidder will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder/Contractor/Subcontractor with confidentiality.

4. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an

impact on the contractual relations between the Principal and the Bidder. The parties offer the Monitor the option to participate in such meetings.

5. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or heal the violation, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action. However, the Independent External Monitor shall give an opportunity to the bidder to present its case before making its recommendations to the Principal.

6. The Monitor will submit a written report to the Chairperson of the Board of the Principal within 8 to 10 weeks from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.

7. If the Monitor has reported to the Chairperson of the Board a Substantiated suspicion of an offence under relevant Anti-Corruption Laws of India, and the Chairperson has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8. The word 'Monitor' would include both singular and plural.

9. In case of any complaints referred under IP Program, the role of IEMs is advisory and the advice of IEM is non-binding on the Organization. However, as IEMs are invariably persons with rich experience who have retired as senior functionaries of the government, their advice would help in proper implementation of the IP.

Section 9 - Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by Chairperson of the Principal.

Section 10 - Other provisions

1. This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal. The Arbitration clause provided in the main tender document / contract shall not be applicable for any issue / dispute arising under Integrity Pact.

2. Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

3. If case of a joint venture, all the partners of the joint venture should sign the Integrity Pact. In case of sub-contracting, the principal contractor shall be solely responsible for the adherence to the provisions of IP by the sub-contractor (s).

4. Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intensions.

.....	**.....**
For the Principal	**For the Bidder/Contractor**
	Witness 1: .....
Date :	
	Witness 2: .....
Place :	

PROFORMA-XX

SAFETY MEASURES

To,
CGM-CONTRACTS (HoD)
OIL INDIA LIMITED
DULIAJAN-786602

SUB: SAFETY MEASURES

Description of Service: Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."

Sir,

We hereby confirm that we have fully understood the safety measures to be adopted during the execution of the above contract and that the same have been explained to us by the concerned authorities. We also give the following assurances.

a) Only experienced and competent persons shall be engaged by us for carrying out work under the said contract.

b) The names of the authorized persons who would be supervising the jobs on day to day basis from our end are the following:

i) _____

ii) _____

iii) _____

The above personnel are fully familiar with the nature of jobs assigned and safety precautions required.

c) Due notice would be given for any change of personnel under item(b) above.

d) We hereby accept the responsibility for the safety of all the personnel engaged by us and for the safety of the Company's personnel and property involved during the course of our working under this contract. We would ensure that all the provisions under the Oil Mines Regulations, 1984 and other safety rules related to execution of our work would be strictly followed by our personnel. Any violation pointed out by the Company's Engineers would be rectified forthwith or the work suspended till such time the rectification is completed by us and all expenditure towards this would be on our account.

e) We confirm that all persons engaged by us would be provided with the necessary Safety Gears at our cost.

f) All losses caused due to inadequate safety measures or lack of supervision on our part would be fully compensated by us and the Company will not be responsible for any lapses on our part in this regard.

g) We shall abide by the HSE (Health, Safety & Environmental) points mentioned below:

GENERAL HEALTH, SAFETY & ENVIRONMENT (HSE) POINTS:

1. The Contractor shall be solely responsible to comply all the statutory norms as applicable while executing the job. It will be solely the Contractor's responsibility to fulfill all the legal formalities with respect to the Health, Safety and Environmental aspects of the entire job (namely: the person employed by him, the equipment, the environment, etc.) under the jurisdiction of the district of that state where it is operating. Ensure that all sub-contractors hired by him comply with the same requirement as the Contractor himself and shall be liable for ensuring compliance of all HSE laws by the sub-contractors. It will be the responsibility of the Contractor/his Supervisor/representative to ensure strict adherence to all HSE measures and statutory Rules during operation in OIL's installations and safety of workers engaged by him. The crew members will not refuse to follow any instruction given by representative of OIL.

2. Contractor's arrangements for health and safety management shall be consistent with those for the company (OIL).

3. A Contractor employee must, while at work, take reasonable care for the health and safety of people who are at the employee's place of work and who may be affected by the employee's Actor omissions at work.

4. The Contractor shall ensure complete safety of the personnel engaged by him, and of all the equipment, they will handle and must take full responsibility for their safety

5. Every person deployed by the Contractor must use appropriate PPEs (Personal Protective Equipment) to be provided by the Contractor. The Contractor shall provide Personnel Protective Equipment as per the hazard identified and risk assessed for the job and conforming to statutory requirement and company's PPE schedule. Safety appliances like protective footwear, Safety Helmet and Full Body harness, Fall Prevention Devises (FPD) shall conform to relevant IS codes. Necessary supportive document shall have to be available at site as proof. If the Contractor fails to provide the safety items as mentioned above to the working personnel, the Contractor may request to the Company (OIL) for providing the same. In case of exigency OIL will provide the safety items if available. However in turn, OIL will recover the actual cost of the items by deducting from Contractor's Bill. However, it will be the Contractor's sole responsibility to ensure that the persons engaged by him use the proper PPE while at work. Contractor employees should be trained in the proper use and maintenance of PPE. In absence of appropriate PPEs, the representative of OIL has the right to stop the work which will be binding for the Contractor. Moreover, the accountability towards any delay in work/ penalty due non-adherence to PPE shall be binding to the Contractor.

6. The Contractor should frame a mutually agreed bridging document between OIL & the Contractor for all issues not envisaged under the terms and conditions of the contract with the roles and responsibilities clearly defined.

7. The Contractor has to keep a register of the persons employed by him/her. The Contractor's supervisor shall take and maintain attendance of his men every day for the work, punctually.

8. Soft copy of the Standard Operating Procedures (SOPs) related to scope of work shall be handed over to the representative of OIL by Contractor including an assessment of risk, wherever possible and safe methods to deal with it/them. Printout of copy (spiral binding) of the SOP mentioned above is to be kept with all working teams at all times. The SOP clearly stating the risk arising to men, machineries & material from the mining operation / other operations to be done by the Contractor and how it is to be managed. However; in case of any doubts, the Contractor shall reconfirm the same from the Engineer In Charge (OIL).

9. Contractor has to ensure that all work is carried out in accordance with the Statute and the SOP for the job. For the purpose, he may deploy adequate qualified and competent personnel for carrying out the job in a safe manner. The work which is not covered under SOP, the Contractor shall develop it and submit to the representatives of OIL.

10. In case of deviation of SOP or non-availability of SOP, Job Safety Analysis (JSA) shall be carried out before commencement of the work.

11. Necessary cold and hot work permits including excavation clearance and permission for working at height, Confined Space Entry as applicable are to be obtained by the competent person of the Contractor from the site representative of OIL before start of the job(s). Work Permit System should be inline as per guidelines issued by HSE Department.

12. The Contractor’s personnel should be aware about the existing as well as probable hazards and ensure their training to tackle such untoward events by the Contractor. If the Company (OIL) arranges any safety awareness program / training for the working personnel at site (company employee, Contractor worker, etc.) the Contractor will not have any objection to any such training.

13. After receipt of the work order the Contractor shall have to submit authorized list of Contract Personnel, who will be engaged for the jobs including name of the Contractor's competent persons and every contact details.

14. The Contractor shall not engage minor laborer below eighteen (18) years of age under any circumstances.

15. The Contractor should prevent the frequent change of his deployed employees as far as practicable. The Contractor shall not employ or terminate his worker without the knowledge of the OIL engineer in charge. However, if OIL Engineer In Charge found any person not appropriate with respect tothe job, the Contractor

has to remove the person and replace a suitable person within the timeline as per the terms of the Contract.

16. OIL will communicate all information to the Contractor or his authorized representative only.

17. The Contractor shall have to report all incidents including near miss to the representative of OIL who shall be supervising the Contractor's work.

18. Any compensation arising out of the job carried out by the Contractor whether related to pollution, Safety or Health will be paid by the Contractor only.

19. Any compensation arising due to accident of the Contractor's personnel while carrying out the job, will be payable by the Contractor and their medical treatment/ facilities in case of accidents should be provided by the same Contractor. The Contractor's personnel should be aware about the existing as well as probable hazards and ensure their training to tackle such untoward events by the Contractor.

20. Contractor shall keep a reasonable degree of order by disposing of accumulated rubbish and excess material. Disposal of solid wastes generated by the Contractor shall be in accordance with the company's Procedure for Solid Waste Management. The Contractor Personnel have to take every possible care to keep the environment clean and free from pollution.

21. The Contractor have to ensure the quality and reliability of all the tools, equipment and instruments they use. The supporting documents relevant to prove the above should be submitted. Defective tools shall be immediately removed.

22. Contractor's Supervisor/ Contractor's personnel needs to be aware about the site specific emergency response plan (which includes display of emergency contact nos., establish telephone communication, layout of working area, use of fire extinguisher, emergency exit, assembly point).
23. All Lifting equipment of the Contractor like Crane etc. shall have to be duly calibrated. Calibration Certificate of this equipment shall have to be submitted to the representatives of OIL and a copy of the same to be made available at site.

24. Necessary sign-board / warning signals like caution, "hot work" in progress, emergency telephone numbers, no entry without permission etc. should be used while working on tanks. The said signals / sign-boards shall have to be arranged by the Contractor and shall be in line with the circular of signboards issued by HSE Department, Oil India Limited.

25. Barricading of area to be done with reflecting tapes as applicable during work.

26. The First-Aid box should be provided by the Contractor and the same has to be kept ready to use at the site throughout the working hours.

27. The availability of First-Aid Fire Fighting equipment should be ensured by the Contractor at all working hours.

28. Smoking is prohibited in all Company restricted areas except in authorized smoking areas/ shelters. Carrying of matches and lighters into the Hazardous Area is prohibited. Cellular phones shall not be used in operating areas / hazardous areas unless they have been classified as 'intrinsically safe' for use in that atmosphere. Consumption of alcohol and possession of non- prescribed drug in Company work site is strictly prohibited.

29. The Contractor personnel should understand the implication of the known hazards related to the work undertaken by them and the necessity of having an emergency plan approved by OIL to counter them, if anything goes wrong.

30. In case Contractor is found non-compliant of HSE laws as required and all the above mentioned general HSE points, company will have the right for directing the Contractor to take action to comply with the requirements, and for further non-compliance, the Contractor will be penalized as per the terms of the Contract.

31. When there is a significant risk to health, environment or safety of a person or place arising because of a non-compliance of HSE Measures Company will have the right to direct the Contractor to cease work until the non-compliance is corrected.

32. Considering the ongoing Covid-19 pandemic, those who are engaged in the above operations should follow the Covid-19 Protocol as per the prevailing Government Guidelines.

33. Any requirement arise by the Statutory Authorities during the period of contract shall be applicable and binding for the Contractor.

34. The Contractor shall report all near misses, minor and reportable accident to the Engineer In Charge and maintain the record of near misses as per OIL's practice.

    The Contractor engaged for any electrical installation, maintenance, repairs etc., should possess a valid electrical Contractor license issued by the State Electricity licensing Board and engage adequate number of competent electrical personnel. All the Competent persons shall have appropriate Work Permit/ Supervisory License issued by State Electricity Licensing Board.

35. The Contractor, wherever applicable, shall obtain necessary hazardous waste authorization from the State Pollution Control Board for storage, handling and disposal of hazardous waste.

(Seal) Yours Faithfully,

Date _____ M/s._____

FOR & ON BEHALF OF CONTRACTOR

Proforma-XXI

COMMERCIAL CHECK LIST

Bidder's Name:_____

IFB No. CDI251327 for **"Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."**

This Questionnaire duly filled in should be returned along with each copy of Un-priced Bid. Clauses confirmed hereunder should not be repeated in the Bid.

Sl. No.	Description	Bidder's Confirmation
1.	Type of Bidding Entity (Proprietorship/ Partnership/ HUF/ Limited Liability Partnership (LLP), Private/Public Limited Company, Society, Government/Public Sector Undertaking (PSU), or any other legal entity):	
2.	Bidder's name and address:	
3.	Submission of documents towards PP-LC as below: (i) The percentage (%) of local content. (ii) An undertaking from the authorised signatory of bidder having the Power of Attorney along with the bid specifying the LC Percentage [**PROFORMA-XVII**]. A copy of their Certificate of Incorporation/registration in India.	
4.	It is noted that deviations to Terms & Conditions shall lead to rejection of offer, as specified in the Tender.	
5.	Ensure and confirm that prices quoted as per 'Schedule of Quantities', are for complete scope	

	of work as defined in the tender.	
6.	Indicate SAC Code Indicate rate of GST applicable.	SAC Code: GST .....%
7.	EMD Details: Whether i) Bid Security submitted (if yes, provide EMD No., Issuing bank, amount with currency and Validity) ii) Bid Security declaration submitted (in case of exemption).	
8.	Confirm to Submit Performance Security as per Tender requirement	
9.	Confirm that the offer shall remain valid for acceptance up to **120 (One Hundred Twenty) days** from the date of bid closing.	
10.	Whether Mobilization and Completion period of contract is complied?	
11.	Whether Integrity Pact Submitted?	
12.	Confirm that quoted prices shall remain firm and fixed until completion of the contract, except as otherwise mentioned in the bid document.	
13.	Confirm that you have submitted all documents as mentioned in the Tender/Annexures	
14.	Confirm acceptance to all terms & conditions of the Tender.	
15.	Confirm that all correspondence must be in English Language only.	
16.	Indicate Name & Contact No. (Telephone/Fax/E-mail) of person signing the bid.	Name: Contact No.: Fax: Email:
17.	Confirm that all Bank charges	

	associated with Bidder's Bank shall be borne by Bidder.	
18.	Please indicate the following: (i) PAN No. (ii) GST Regn. No.	

Bidder confirms that in case of conflicting version of various terms & conditions at different places, the confirmation furnished as above shall be considered over-riding and final and any other deviation indicated elsewhere shall be treated as redundant.

Signature _____

Name _____

Designation _____

Office Stamp _____

APPENDIX-1

DECLARATION ABOUT BIDDER'S FINANCIAL STANDING

To,
OIL INDIA LIMITED
DULIAJAN
ASSAM-786602

Sub: Undertaking/Declaration regarding financial standing

Ref: IFB No. **CDI251327**

We, _____ (name of bidder), hereby confirm that:

(1) We are neither bankrupt nor undergoing any insolvency resolution process or liquidation or bankruptcy proceeding under any law.

(OR)

(2) No insolvency resolution process or liquidation or bankruptcy proceeding is initiated under any law against us.

Place: _____

Date: _____

_____
(Name & Signature of the authorised
signatory of the bidder)

APPENDIX-2

DECLARATION THAT BIDDER IS NOT UNDER HOLIDAY LIST/ DELISTED/ BLACKLISTED/DEBARRED IN OIL

To,
OIL INDIA LIMITED
DULIAJAN
ASSAM-786602

TENDER NO. CDI251327

Tender Description: Hiring Service for Design, Engineering, Manufacture, Supply, Testing & Commissioning of 33KV/11KV Grid Power Receiving Sub-Station at OIL Moran in LSTK-EPC basis."

Sub: Undertaking/Declaration regarding Holiday List, debarment etc.

Ref: Tender No. _____

a) We, ____ (Name of the bidder) solemnly affirm that we have read and understood OIL's Banning Policy as available at OIL's website https://www.oil-india.com/banning-policy and accept the Banning Policy in toto without any demur, protest, reservations and agree to be bound by the said Policy.

b) We, hereby declare that neither our company nor any of its allied concerns, partners or associates or directors or proprietors involved in any capacity, are currently put on holiday list/banning list by OIL debarring us/them from carrying on business dealings with OIL.

c) We, also hereby declare that neither our company nor any of its allied concerns, partners or associates or directors or proprietors involved in any capacity, have not been involved in any previous transgressions in the last 3 years with any other company in any country conforming to the TI (Transparency International) approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

d) We, disclose the following allied concerns, partners or associates or directors or proprietors involved in any capacity in terms of the definition of Allied firms given in the "Banning Policy" of Oil India Limited:

Sl. No.	Name	Address	PAN No.	GST No.	OIL Vendor Code

Place: _____

Date: _____

_____
(Name & Signature of the authorised signatory of the bidder)

EXHIBIT–I

UNDERTAKING FOR WORKS INVOLVING POSSIBILITY OF SUB-CONTRACTIONG

(REF. CLAUSE NO. 11.0 OF THE BEC/PQC)

We, M/s _____, have read the clause regarding restrictions on procurement from a country which shares a land border with India and on sub-contracting to contractors from such-countries, we certify that we are not from such a country/or if from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. We hereby certify that we fulfil all requirements in this regard and are eligible to be considered.

Yours faithfully,

For (type name of the firm here)

Signature of Authorized Signatory

Name:

Designation:

Phone No.

Place:

Date:

(Affix Seal of the Organization here, if applicable)

EXHIBIT–II

UNDERTAKING TOWARDS COMPLIANCE OF CLAUSE NO. 11.0 OF THE BEC/PQC

We, M/s _____, have read the clause regarding restrictions on procurement from a country which shares a land border with India, we certify that we are not from such a country/or if from such a country, has been registered with the Competent Authority. We hereby certify that we fulfil all requirements in this regard and is eligible to be considered.

Yours faithfully,

For (type name of the firm here)

Signature of Authorized Signatory

Name:

Designation:

Phone No.

Place:

Date:

(Affix Seal of the Organization here, if applicable)

EXHIBIT–III

ADDITIONAL UNDERTAKING BY BIDDER IN CASES OF SPECIFIED TRANSFER OF TECHNONLOGY (ToT)

(REF. CLAUSE NO. 11.0 OF THE BEC/PQC)

We, M/s _____, have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. We certify that we do not have any ToT arrangement requiring registration with competent authority.

OR

We, M/s _____, have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. We certify that we have valid registration to participate in this procurement.

Yours faithfully,

For (type name of the firm here)

Signature of Authorized Signatory

Name:

Designation:

Phone No.

Place:

Date:

(Affix Seal of the Organization here, if applicable)

PROFORMA-M

PROFORMA FOR UNDERTAKING FROM THIRD PARTY INSPECTION AGENCY

(to be submitted on official letter head)

TO
M/s. OIL INDIA LIMITED
DULIAJAN-786602
DIST.-DIBRUGARH, ASSAM

Sir,

SUB: OIL's Tender No. CDI251327

M/s. _____ having registered office at _____ intend to participate in the above referred tender of OIL INDIA LIMITED.

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

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

Note: In the event of any requirement, OIL reserves the right to ask the inspection agencies to verify the documents with source, if required at no extra cost to OIL.

Thanking you,

Authorised Person's Signature:_____

Name: _____

PROFORMA-XXIII

FORMAT FOR HINDRANCE REGISTER

Description of Project:..... **Contract No. & Date:**.....

Contractor's Name:..... **Scheduled Completion Date:**.....

Sl No.	Nature of Hindrance	Items of work that could not be executed because of this hindrance	Date of start of Hindrance	Date of Removal of Hindrance	Period of Hindrance	Overlapping period, if any	Net Hindrance days	Remarks
Signature of Contractor's Representative			**Signature of Engineer-in-charge**			**Signature of HoD**		

Appendix-VII

Questionnaire for vendors and suppliers

			Response
1. Emissions	What was the GHG emission for the last financial year?	a) Scope 1 GHG emissions (kg CO_2e)	
		b) Scope 2 GHG emissions (kg CO_2e)	
	What was the GHG emission per unit of revenue for the last financial year?	a) Scope 1 GHG emissions (kg CO_2e)	
		b) Scope 2 GHG emissions (kg CO_2e)	
2. Decarbonization strategy & targets	Do you have a Net Zero target? If yes, please state the year		
	Do you have an emissions reduction target? If yes, are the targets absolute emissions based, or intensity based?		
	Please state the target for reduction in next financial year	a) Scope 1 GHG emissions/emissions intensity	
		b) Scope 2 GHG emissions/emission is intensit y	
	Please provide information on a few decarbonization initiatives undertaken (describe the initiatives and their respective impact)		
3. Waste & Water Mgt.	Do you have any initiatives for waste management including solid wastes, liquid wastes and hazardous waste?		
	Do you have any initiatives for water management including monitoring of water consumption and withdrawals, and if applicable, treatment of wastewater?		
4. Disclosures	Are your current emissions verified? If yes, please name the assuring body		
	Are your emissions targets validated (eg: SbTi)? If yes, please name the methodology		
	Are you rated by any of the ESG rating agencies? If yes, please specify the agency and rating		

Suppliers and vendors may refer to the explanatory note for any questions or clarifications pertaining to any of the question s above.

TECHNICAL EVALUATION SHEET FOR BEC/PQC

PROFORMA-XXII

Bidder's Name: _____

Sl. No.	Clause No of BEC/PQC	Description	Compliance		Bidder to indicate Relevant Page No. of their Bid to support the remarks/ compliance
			Yes	No	
1	1.0	**VITAL CRITERIA FOR BID ACCEPTANCE:** The bid shall conform to the specifications and terms and conditions given in the Bidding Documents. Bids will be rejected in case material and services offered do not conform to the required parameters stipulated in the technical specifications. Notwithstanding the general conformity of the bid to the stipulated specifications, the following requirements will have to be particularly met by the Bidders without which the same will be considered as non-responsive and will not be considered for evaluation. All the documents related to BEC shall be submitted along with the Technical Bid. **Note:** Bidders are advised not to take any exception/deviation to the Bid Documents. Exceptions/Deviations, if any, should be brought out during the Pre-Bid Conference as scheduled against this Tender. After processing such suggestions, Company may communicate the changes, if any, through an addendum to the tender document. Still, if any exceptions/deviations are maintained in the bid, such conditional/nonconforming bids shall not be considered, but shall be rejected.			

TECHNICAL EVALUATION SHEET FOR BEC/PQC

PROFORMA-XXII

2	**1.1**	**ELIGIBILITY CRITERIA:** **The bidder must be incorporated/constituted in India and must maintain equal to or more than 20% local content (LC) for the offered services to be eligible to bid against this tender.** Regarding calculation of local content and submission of documents during bidding & execution of contracts, provision of **Public Procurement (Preference to Make in India) Order, 2017 of Department for Promotion of Industry and Internal Trade (DPIIT), Govt. of India as amended time to time with modifications as notified vide MoPNG Order No. FP-20013/2/2017-FP-PNG-Part (4) (E-41432) dated 26th April 2022 (including subsequent amendments thereof, if any)** shall be applicable. If such local content is not maintained during execution of contract, OIL reserves the right to invoke the Performance Securities submitted by the bidding and supporting companies, in addition to resorting to other options as may be deemed appropriate. Whether or not the bidders want to avail PP-LC benefit against this tender, it is mandatory for them to meet the following at the bidding stage: **(a)** The bidder must provide the specific **percentage (%) of local content** in their bid, without which the bid shall be liable for rejection being non-compliant**.** (b) The Bidder shall submit an undertaking from the authorised signatory of bidder having the Power of Attorney along with the bid specifying the LC Percentage and such undertaking shall become a part of the contract, if awarded. [Format enclosed as **PROFORMA-XVII**]			

		(c) The aforesaid undertaking of the bidder shall also be supported by a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of other than companies) giving the percentage of local content. (d) Bidder to submit a copy of their Certificate of Incorporation/constitution in India.			
3	**3.0**	**3.1 <u>EXPERIENCE CRITERIA</u>:** 3.1.1 The Bidder must be the OEM (Original Equipment manufacturer) of both 33kV (or above) and 11kV (or above) voltage level of Air Insulated Switchgear/Gas Insulated Switchgear. In this regard, the bidder must submit an OEM Declaration/Certificate on its letterhead, duly signed by an authorized signatory, confirming the same. 3.1.2 Bidder must have experience of successfully completing at least one work of Supply, Installation, Testing and Commissioning of 33KV and 11 KV switchgear / switchboard in customized prefabricated modular outdoor container facility (E-House) in previous last 07 (Seven) years reckoned from the original bid closing date in Central/State Government/ PSUs/Nationalized Banks/Public Limited Company. 3.1.3 The bidder shall submit Type Test Certificates issued by National Accreditation board for Testing and calibration Laboratories (NABL)/BIS/CPRI/ILAC accredited laboratories/STL members/central govt. approved laboratories or any other reputed national or international laboratories in the name of the Original Equipment			

		Manufacturer (OEM) only. For the offered make, model and rating of the 33 kV Switchgear and 11 kV Switchgear, the following Type Test Certificates not older than **15 (fifteen) years** reckoned from the original bid closing date must be submitted along with the bid: i) Temperature Rise Test ii) Dielectric Test iii) Internal Arc Classification Test for Cable Chamber and Busbar Chamber iv) Short-Time Withstand Current and Peak Withstand Current Tests 3.1.4 Availability of Support for relay: The numerical relays offered for 33 KV and 11 KV switchboard shall be of single make. The relays offered shall be supported by the relay Original Equipment Manufacturer (OEM) for a period of minimum 10 years from the date of Original Bid Closing date of this tender. The bidder shall submit a declaration as per 'Form-Declaration Relay Support' along with the technical bid. **Notes to Clause 3.1.2 above:** **A.** For proof of requisite experience (refer Clause No. 3.1.2 above), the following documents/photocopy (self-attested/attested) must be submitted along with the bid: i) Contract document/LOI/LOA/WO showing details scope of work and technical specifications,, AND			

		ii) Job Completion Certificate(JCC)issued by the end user/client in their official letter head duly sealed and signed showing: a) Gross value of job done/ quantity done b) Nature of jobs done and Work Order No./Contract No. c) Contract period and date of completion. OR SES (Service Entry Sheet)/Certificate of Payment (COP) issued by the company indicating the following: a) Work Order No./Contract No. b) Gross value of jobs done/ quantity done. c) Period of service d) Nature of service **B.** Only Letter of Intent (LOI)/Letter of Award (LOA) and/or Work Order(s), Job Completion certificates are not acceptable as evidence of experience. **C.** In case the requisite experience is against **OIL's contract**, the bidder shall only be required to categorically specify **OIL's Contract Number** and **date**. **D.** Mere award of contract(s) shall not be counted towards experience. Successful completion of the awarded contract(s), as stipulated respectively under Clause No. 3.1.2 shall only be treated as acceptable experience. **E.** Following work experience will also be taken into consideration:			

		a) If the prospective bidder is executing a contract/order which is still running and a part of contract/order which has been executed within the specified period prior to due date of bid submission is as per Clause 3.1.2 above, such experience may also be taken into consideration provided that the bidder has to submit a satisfactory work / supply and service execution certificate issued by end user confirming requirement as per Clause 3.1.2 above. b) In case the start date of the requisite experience is beyond the prescribed 07 (seven) years reckoned from the original bid closing date, but completion is within the prescribed 07 (seven) years reckoned from the original bid closing date. c) If the prospective bidder has executed a contract in which work (as mentioned under Clause No. 3.1.2) is a component of the contract. Note: In case the documents submitted as per Para A above, are not sufficient to establish the required information of clause 3.1.2 against Para E (a), (b) & (c) above, the bidder shall also have to submit the breakup of the works executed under such contract(s) clearly indicating the value / quantity / period of the work carried out as per clause 3.1.2 which should be certified by the end user or a certificate issued by a practicing Chartered/ Cost Accountant Firm (with Membership Number & Firm Registration Number). **F.** Experience of executing work (as mentioned under Clause No. 3.1.2) through 'sub-contracting' shall not be considered for evaluation. **G.** Work executed(as mentioned under Clause No. 3.1.2) by a bidder for its own organization/subsidiary cannot be considered as experience for the purpose of meeting BEC.			

		H. Bid will be rejected if not accompanied with adequate documentary proof in support of Work experience as mentioned in Para 3.1.2. **I.** Oil India Limited (OIL) reserves the right to contact the Client(s) referred by the Bidder for authentication of the documents submitted by the Bidder. OIL may contact the clients/operators under intimation/copy to the respective Bidder. It will be the responsibility of the Bidder to take up the matter with his Client(s) and arrange for the confirmation as desired by OIL.] **J.** Bidders submitting their bid based on the experience of their Technical Collaborator/Joint Venture/Parent/Subsidiary/Co-subsidiary/Sister Subsidiary/MOU with another party shall not be considered. Bids from Consortium, Joint Venture shall also not be considered. **K.** Only one bid from any individual bidder or entity shall be accepted against the tender. If a bidder or firm is found to have participated in more than one bid -either in their own name or through an associated entity, by way of a tie-up/ agreement/Memorandum of Understanding (MoU) - then all such bids shall be summarily rejected.			
4	**4.0**	**MOBILIZATION PERIOD**: The bidders must confirm their compliance in their "technical" bid to complete the mobilization within **15 (Fifteen) days from the date of issuance of Mobilization Notice** Offers without confirmation of stipulated mobilization time or with mobilization time more than **15 (Fifteen) days** shall be summarily rejected. The bidder shall confirm compliance of this in their technical bid.			

TECHNICAL EVALUATION SHEET FOR BEC/PQC

PROFORMA-XXII

5	**5.0**	**FINANCIAL CRITERIA:** **5.1** Annual Financial Turnover of the bidder in any of preceding 03 (three) financial/accounting years, reckoned from the original bid closing date should be at least **Rs. 11,90,99,000.00** only. **5.2 Net worth** of bidder must be positive for preceding financial/accounting year. **Note**: • Annual Financial Turnover of the bidder from operations shall mean: "Aggregate value of the realisation of amount made from the sale, supply or distribution of goods or on account of services rendered, or both, by the company (bidder) during a financial year" as per the Companies Act, 2013 Section 2 (91). • Net worth shall mean: "Share capital + Reserves created out of profits and securities Premium – Aggregate value of accumulated losses (excluding revaluation reserves) – deferred expenditure – Miscellaneous Expenditure to the extent not written off and carried forward Loss - Reserves created out of write back of depreciation and amalgamation" • The Net worth to be considered against the clause above, should be read in conjunction with the definition of Net worth as mentioned in Section 2 (57) of The Companies Act, 2013.			
5	**Notes to BEC Clause No. 5.0 above**	**Notes to BEC Clause 5.0 above:** A. For proof of Annual Turnover from operation and Net worth			

		any one of the following document must be submitted along with the bid: (i) A certificate issued by a practicing Chartered/Cost Accountant (with Membership Number and Firm Registration Number), certifying the Annual turnover & Net worth as per format prescribed in **Proforma-VII**. OR (ii) Financial Statements (Balance Sheet & Profit & Loss account **along with all the schedules/notes forming part of the Balance sheet & Profit and Loss Account**) audited by the auditors appointed under the statute like Companies Act etc. wherever applicable. In cases where the bidding/ supporting company (as applicable) are not required to prepare Audited Financial Statements as per the Law of the Land of the country of the bidding/supporting company as applicable, the bidder shall provide documentary evidence for the same along with a certificate from a practicing Chartered Accountant or equivalent to this effect. The bidder must also submit the financial statement as per the accounting standards of the country of the bidding/supporting company as the case may be, duly certified by the practicing-chartered accountant or equivalent. ***Note**: Mention of UDIN (Unique Document Identification Number) is mandatory for all Certificates issued w.e.f. February 1, 2019 by Chartered Accountant in Practice. B. Considering the time required for preparation of Financial Statements, if the last date of preceding financial/accounting year falls within the preceding six months /within the due date for furnishing of audit report			

		as per Section 139(1) of IT Act, 1961 (read along with latest circulars/notifications issued by CBDT from time to time) reckoned from the original bid closing date and the Financial Statements of the preceding financial/accounting year are not available with the bidder, then the financial turnover of the previous three financial/accounting years excluding the preceding financial/accounting year will be considered. In such cases, the Net worth of the previous financial/accounting year excluding the preceding financial /accounting year will be considered. However, the bidder has to submit an undertaking in support of the same along with their technical bid as per **PROFORMA-VI**. C. In case the bidder is a Central Govt. organization/PSU/State Govt. organization /Semi-State Govt. Organization or any other Central/State Govt. Undertaking, where the auditor is appointed only after the approval of Comptroller and Auditor General of India and the Central Government, their certificates may be accepted even though FRN is not available. However, bidder to provide documentary evidence for the same. D. In case the bidder is a Government Department, they are exempted from submission of documents mentioned under **Para-A. & Para-B.** above. E. Bid will be rejected if not accompanied with adequate documentary proof in support of Annual turnover and Net worth as mentioned in Para 5.1 & 5.2.			
6	**6.0**	**COMMERCIAL EVALUATION CRITERIA** 6.1 The bids are to be submitted in **Single stage under Two Bid System** i.e., Un-priced Techno-Commercial Bid and Price Bid together. The Un-priced techno-commercial bid (or technical bid) must comprise of all the technical documents			

		substantiating the previous experience, financial & technical credentials of the bidder and any other document as asked for in the bid document. **There should not be any indication of price in the technical bid; otherwise, the bid shall be rejected straightway** 6.2 The price quoted by the successful bidder must be firm during the performance of the contract and not subject to variation on any account except as mentioned in the bid document. Any bid submitted with an adjustable price quotation other than the above will be treated as non-responsive and rejected. 6.3 **EMD/Bid Security:** Bid Security in Original shall be furnished as a part of the Techno Commercial Un-priced Bid and shall reach the office of **CGM- CONTRACTS, OIL at Duliajan** on or before **12.45 Hrs (IST)** on the Bid Closing Date (BCD). A scanned copy of the bid security shall however be uploaded in OIL's E-Procurement along with the Technical Bid. The amount of Bid Security shall be **₹ 47,64,000.00.** Bid without proper & valid Bid Security will be rejected. PPP [Public Procurement policy] for Micro and Small Enterprises is not applicable for this tender (**being works contract tender**). Hence, Purchase Preferences allowed as per Government Guidelines in Vogue and exemption from submission of bid security against MSE Units is not applicable for this tender For detailed may please refer to **Clause No. 9.0 of INSTRUCTIONS TO BIDDERS (ITB).** 6.4 Bid Documents/User Id & Password for OIL's E-Tender portal are not transferable. 6.5 Any bid received in the form of Physical document/Telex/Cable/Fax/E-mail will not be accepted.			

		6.6 Bids shall be typed or written in indelible ink. The Bids and all uploaded documents must be digitally signed using "Class 3" digital certificate [ecommerce application (Certificate with personal verification and Organization name)] as per Indian IT Act obtained from the licensed Certifying Authorities operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA) of India[except copies of the documents required in physical form] should invariably be submitted in the 'Technical Attachment Tab' through OIL's e-bidding portal, before the scheduled date and time for the tender closing. All the documents uploaded shall be digitally signed by the authorized signatory of the bidder. 6.7 Bids shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by bidder, in which case such corrections shall be initiated by the persons(s) signing (digitally) the bid. However, white fluid should not be used for making corrections. Any bid not meeting this requirement shall be rejected. 6.8 Any bid containing false statement will be rejected and action will be taken by Company as per Bid Document. 6.9 Bidders must quote clearly and strictly in accordance with the price schedule outlined in **Price Bidding Format** attached under "**Notes and Attachments**" tab in the main bidding engine of OIL's E-Tender portal; otherwise the bid will be rejected. All other techno-commercial documents other than price details to be submitted with Unpriced Techno-Commercial Bid as per tender requirement under "**Technical Attachment**" Tab Page only. 6.10 Bidder must accept and comply with the following provisions as given in the Tender Document in toto, failing which offer			

		will be rejected: (i) Firm price (ii) Bid Security/EMD (iii) Period of validity of Bid (iv) Price Schedule (v) Performance Bank Guarantee / Security deposit (vi) Delivery/Completion Schedule (vii) Scope of work (viii) Guarantee of material/work (ix) Liquidated Damages clause (x) Tax liabilities (xi) Arbitration/Resolution of Dispute Clause (xii) Force Majeure (xiii) Applicable Laws (xiv) Specifications (xv) Integrity Pact (xvi) Mobilization 6.11 There should not be any indication of price in the Un-priced Techno-Commercial Bid. A bid will be straightway rejected if this is given in the Un-priced Techno-Commercial Bid. 6.12 Bid received with validity of offer less than **120 (One Hundred Twenty) days** from the date of Technical Bid opening will be rejected. Bidder must submit a declaration regarding bid validity as per the format prescribed in **PROFORMA-I.** 6.13 The Integrity Pact is applicable against this tender. OIL shall be entering into an Integrity Pact with the bidders as per format enclosed vide **Proforma-XIX** of the tender document. This Integrity Pact proforma has been duly signed by OIL's competent signatory. The proforma must be returned by the bidder (along with the Un-priced Techno-Commercial Bid) duly signed (digitally) by the same signatory who signed the			

		bid, i.e., who is duly authorized to sign the bid. Uploading the Integrity Pact with digital signature will be construed that all pages of the Integrity Pact have been signed by the bidder's authorized signatory who sign the Bid. 6.14 Bidders should not be under liquidation/bankruptcy/undergoing any insolvency resolution process as on Bid Closing date. Bidders shall submit undertaking towards compliance of above as per the prescribed formats **(Appendix-1)** along with the bid. If any bidder declines to submit the above undertakings, their bids shall be liable for rejection. 6.15 The bidder shall submit an undertaking/declaration as per **Appendix-2**. confirming that they have read and understood OIL's Banning Policy and that, neither they nor any of their allied concerns or partners or associates or directors, or proprietors involved in any capacity, are currently on OIL's Holiday/Banning List. Further, the bidder shall confirm that neither they nor any of their aforementioned entities have, during the last three years, been involved in any transgression with any company conforming to the Transparency International (TI) approach or with any Public Sector Enterprise of India that could justify exclusion from the tender process. The bidder shall also disclose details of all such allied entities, if any, as required under the Banning Policy. 6.16 Only one bid against a party offering individually as well as under Proprietorship/Partnership firms shall be accepted. In case any bidder is found to submit more than one bid including separate bids under proprietorship as well as under any Partnership firm then all the bids submitted by the bidder in his own name or in the name of firm where he/she is a partner/sole proprietor will be rejected.			

TECHNICAL EVALUATION SHEET FOR BEC/PQC

PROFORMA-XXII

7	**7.0**	**PRICE EVALUATION CRITERIA** 7.1 Price bid shall be opened in respect of only the techno-commercially acceptable bidders whose bids have been found to be substantially responsive. A substantially responsive bid is one that meets the terms and conditions of the Tender and/or the acceptance of which bid will not result in indeterminate liability on OIL. 7.2 The quantities shown against each item in the "Price Bid Format" shall be considered for the purpose of Bid Evaluation. It is, however, to be clearly understood that the assumptions made in respect of the quantities for various operations are only for the purpose of evaluation of the bid and the Contractor will be paid on the basis of the actual number of days/parameter, as the case may be. 7.3 If there is any discrepancy between the unit price and the total price, the unit price will prevail and the total price shall be corrected. Similarly, if there is any discrepancy between words and figure, the amounts in words shall prevail and will be adopted for evaluation. 7.4 The bidders are advised not to offer any discount/rebate separately and to offer their prices after considering discount/rebate, if any. 7.5 If a bidder quotes Total Charges/Consideration as NIL, the bid shall be treated as unresponsive and will not be considered. 7.6 Bidders are required to quote for all the items in the BOQ/Price Bid/ Financial Document. However, if no charge is involved for any of the work/item, 'NIL' should be mentioned against such part of work. If any item in the Price Bid Format is left blank, then it will be construed that for that item bidder has quoted rate as "0".			

		7.7 Conditional and unsolicited discounts will not be considered in the evaluation. However, if such a bidder happens to be the lowest recommended bidder, an unsolicited discount without any condition will be considered for computing the contract price. **7.8 The inter-se-ranking of all the techno-commercially qualified bidders will be determined on overall lowest cost basis (L-1 offer) i.e. considering the Total quoted price inclusive of all liabilities and GST (CGST & SGST/UTGST or IGST).** 7.9 Based on the evaluation of techno-commercially qualified bidders, the job will be awarded to the L-1 bidder. 7.10 In case of identical overall lowest offered rate by more than 01 (one) bidder, the selection will be made by draw of lot between the parties offering the same overall lowest price. 7.11 OIL will prefer to deal with registered bidder under GST. Therefore, bidders are requested to get themselves registered under GST, if not registered yet. However, in case any unregistered bidder is submitting their bid, their prices will be loaded with applicable GST while evaluation of bid. Where OIL is entitled for input credit of GST, the same will be considered for evaluation of bid as per evaluation methodology of tender document. 7.12 When a bidder mentions taxes as extra without specifying the rates & amount, the offer will be loaded with maximum value towards taxes received against the tender for comparison purposes. If the bidder emerges as lowest bidder after such loading, in the event of order on that bidder, taxes mentioned by OIL on the Purchase Order/Contracts will be binding on the bidder.			

		7.13 Input Tax Credit on GST (Goods & Service Tax) for this service is NOT available to OIL & the bids will be evaluated based on total price including GST. 7.14 For evaluation purposes, quoted unit rates against each Line Item of the price bidding format shall be considered only up to two (2) decimal places without rounding off for evaluation.			
8	**8.0**	**PURCHASE PREFERENCE CLAUSE** **8.1 PURCHASE PREFERENCE TO MSE BIDDERS (NOT APPLIACBLE FOR THIS TENDER):** Purchase Preference to Micro and Small Enterprises is applicable for this tender. Documentation required to be submitted by MSEs: Categorization and various criteria applicable to MSE bidders shall be guided by the Gazette Notification No. CG-DL-E-26062020-220191 dated 26.06.2020 (and as amended time to time) issued by MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISES. The bidder claiming the MSE status (MSE-General, MSE-SC/ST, MSE-Woman) against this tender has to submit Udyam Registration Number with Udyam Registration Certificate along with the technical bid for availing the benefits applicable to MSEs. Note: In case bidding MSE is owned by Schedule Caste or Schedule Tribe or Woman entrepreneur, valid documentary evidence issued by the agency who has registered the bidder as MSE owned by SC/ST/Woman entrepreneur should also be enclosed. **8.2 PURCHASE PREFERENCE POLICY (LINKED WITH LOCAL CONTENT) (PP-LC):** Purchase preference under Public Procurement (Preference to Make in India) Order, 2017 of Department for Promotion of Industry and Internal Trade (DPIIT), Govt. of India as revised vide Order No. P-45021/2/2017-PP (BE-II) dated 16th September 2020 (and as amended time to time) with modifications as notified vide			

		MoPNG Order No. FP-20013/2/2017-FP-PNG-Part (4) (E-41432) dated 26th April 2022, shall be applicable in this tender. Bidders to check the provisions of the Order for their eligibility to bid and seek benefits for Purchase preference, accordingly. **8.3** Contract shall be awarded for the entire scope of work under this tender subject to concurrent application of Public Procurement Policy for MSE Order 2012 and PP(MII) Order 2017 as per Order No. F.1/4/2021-PPD dated 18.05.2023 issued by Public Procurement Division, Department of Expenditure, Ministry of Finance, Govt. of India and any subsequent amendment thereto. **Note:** Services under this tender is not splitable. i.			
9	**9.0**	**GENERAL:** 9.1 In case bidder takes exception to any clause of bidding document not covered under BEC/PQC, then the Company has the discretion to load or reject the offer on account of such exception if the bidder does not withdraw / modify the deviation when/as advised by company. The loading so done by the company will be final and binding on the bidders. No deviation will however be accepted in the clauses covered under BEC-BRC. 9.2 To ascertain the substantial responsiveness of the bid, the Company reserves the right to ask the bidder for clarification in respect of clauses covered under BEC also and such clarifications fulfilling the BEC clauses in toto must be received on or before the deadline given by the company, failing which the offer will be liable for rejection. Since pre-bid meeting is provisioned in this tender, Company is not obligated to seek any post-bid clarification. However,			

		clarifications if decided to be sought at the option of Company, the same shall be limited to the original submissions only and no independent fresh submission shall be called for/permitted. However, mere submission of such clarification shall not make the offer responsive, unless company is satisfied with the substantial responsiveness of the offer. 9.3 If any of the clauses in the BEC-BRC contradict with other clauses of bidding document elsewhere, the clauses in the BEC-BRC shall prevail. 9.4 Bidder(s) must note that requisite information(s) / financial values etc. as required in the BEC-BRC & Tender must be clearly understandable from the supporting documents submitted by the Bidder(s); otherwise Bids shall be rejected. 9.5 OIL will not be responsible for delay, loss or non-receipt of applications for participating in the bid sent by mail and will not entertain any correspondence in this regard. 9.6 The originals of such documents [furnished by bidder(s)] shall have to be produced by bidder(s) to OIL as and when asked for.			
10	**10.0**	**DOCUMENT AUTHENTICITY UNDERTAKING:** Bidders should note that Company (OIL) may verify authenticity of all the documents /certificates/information submitted by the bidder(s) against the tender. In case at any stage of tendering process or Contract execution etc., if it is established that bidder has submitted forged documents/certificates/information towards fulfilment of any of the tender/contract conditions, Company shall immediately reject the bid of such bidder(s) or			

		cancel/terminate the contract besides taking action as per OIL's Banning Policy dated 6th January 2017 revised on 17.03.2023, available in the OIL's website. Accordingly, service provider/vendor to submit the Undertaking of authenticity of information/documents submitted as per **PROFORMA-XI**.			
11	**11.0**	**LAND BORDER SHARING:** Bidders should submit an Undertaking that, their bid is compliant to Order No. F.No. 6/18/2019-PPD dated 23.07.2020 issued by Ministry of Finance, Department of Expenditure, Public Procurement Division, Govt. of India (including subsequent amendments thereto, if any), regarding restrictions on procurement from a bidder of a country which shares land border with India. In this regard, bidders must submit duly sealed & signed undertaking as per format provided vide **Exhibit-I, Exhibit-II** and **Exhibit-III** along with the technical bid.			
12	**12.0**	Bidders have to submit a declaration as per the format prescribed in **PROFORMA-XX** regarding compliance of Safety Measures along with the technical bid.			
13	**13.0**	**CHECKLIST FOR BEC-BRC:** Enclosed as BEC/PQC CHECKLIST**(Proforma-XXII) and Commercial Checklist (Proforma-XXI).** To be submitted along with the technical bid. **Note: Bidder shall submit the prescribed checklists for BEC, Technical Criteria etc. If any bidder declines to submit the duly filled checklists, their bids shall not be considered for evaluation.**			

<table>
<tr><td>14</td><td>14.0</td><td><u>COMPLIANCE OF THE COMPETITION ACT, 2002:</u>

The bidder shall strictly comply with the provisions of the Competition Act, 2002, more particularly, Section-3 of the Act. Any violation the provisions of the Act shall attract penal action under the Act.</td><td></td><td></td><td></td></tr>
<tr><td>15</td><td></td><td>15.0 <u>VERIFICATION AND CERTIFICATION OF DOCUMENTS BY INDEPENDENT THIRD-PARTY INSPECTION AGENCIES (TPIA)</u>:

15.1 Oil India Limited (OIL) has engaged the following 17 (Seventeen) Independent Inspection Agencies for a period of 04 (Four) years up to 06.06.2028 to verify the authenticity of documents required against BEC to be submitted by the bidders against the tender:
<table>
<tr><th>Sl. No.</th><th>Name of Independent Inspection Agency</th><th>Contact E-mail ID</th></tr>
<tr><td>i.</td><td>M/s. Alfred H Knight India Private Limited.</td><td>a. rkjain@ahkgroup.com
b. pradeep.mathur@ahkgroup.com
c. info@ahkgroup.com</td></tr>
<tr><td>ii.</td><td>M/s. TUV India Private Limited</td><td>a. noida@tuv-nord.com
b. mumbai@tuv-nord.com
c. salim@tuv-nord.com</td></tr>
<tr><td>iii.</td><td>M/s Conformity India International Private Limited</td><td>a. mktg@ciindia.in</td></tr>
<tr><td>iv.</td><td>M/s Ravi Energic Private Limited</td><td>a. baroda@ravienergic.com
b. tpia@ravienergic.com</td></tr>
</table></td><td></td><td></td><td></td></tr>
</table>

			v.	M/s SGS India Private Limited	a. dhaval.vora@sgs.com b. sgs.india@sgs.com			
			vi.	M/s Assure Quality Management Certification Services Private Limited	a. aqmcs@aqmcs.com			
			vii.	M/s. ISSPL Limited	a. industrial_services@irclass.org b. oilandgas@irclass.org			
			viii.	M/s. TÜV Rheinland (India) Pvt. Ltd.	a. Shailesh.deotale@ind.tuv.com b. Kaushal.gohil@ind.tuv.com c. info@ind.tuv.com d. ravi.kumar@ind.tuv.com			
			ix.	M/s Gulf Lloyds (India) Ltd.	a. contact@gulflloyds.com b. inspection@gulflloyds.com			
			x.	M/s Baltic Testing India Pvt. Ltd.	a. office@balticcontrolindia.com			
			xi.	M/s Sanmarg Engineering Validation & Assessment	a. Amitra@sanmargeva.com			
			xii.	M/s Meenar Global Consultants LLP	a. sales@mgellp.in			
			xiii.	M/s Rites Limited	a. nrinspn@rites.com b. info@rites.com c. sbu.ninsp@rites.com			
			xiv.	M/s Bureau Veritas (India) Private Limited	a. bvindia.corporate@bureauveritas.com			

			xv.	M/s TUV SUD South Asia Private Limited	a. Hemant.chavan@tuvsud.com b. Jayashree.rane@tuvsud.com			
			xvi.	M/s Adornment Engineers India Private Limited	a. jks@adornmentengineers.com			
			xvii.	M/s TCRC Inspections Pvt. Ltd.	a. admin@tereinspections.com b. ashismallick@teregroup.com c. tenders@teregroup.com			
		15.2 Bidders are required to have their following documents verified and certified by any one of the empanelled Independent Third-Party Inspection Agencies listed below: **(i) Technical Criteria: Relevant documents required against BEC Clause Nos. 3.0.** **(ii) Financial Criteria: Line of Credit, if incorporated in the Tender** **(iii) General Requirement: Bidder's Certificate of Incorporation.** **(iv) Additional Documents: As per tender requirement.** The Inspection Certificate, duly issued by the selected agency, must be submitted along with the Technical Bid. All costs related to verification and certification by the Thirty-Party Inspection Agencies shall be borne solely by the respective bidders. Payments in this regard shall be made directly by the bidders to the Inspection Agencies. OIL shall not be held responsible for any payment-related dispute between the bidders and the inspection agencies. 15.3 **The verified and certified documents (As mentioned in Para 10.2 above) must be submitted along with the Technical Bid**s. Any bid submitted with un-verified					

		supporting documents shall not be considered. However, in case a bidder submits its bid along with all relevant supporting documents as per BEC without getting all/some of them verified by the designated Independent Inspection agency, such bid can be provisionally considered, provided it is accompanied by an Undertaking by the Bidder on their official letterhead towards submission of the duly verified and certified copies and Inspection Certificate within 07 (Seven) days from the actual date of bid opening. **No reminders or clarifications will be issued by the Company in this regard, and failure to submit the verified/ certified documents within the stipulated time shall result in outright rejection of the bid, at the sole risk and responsibility of the bidder.** 15.4 The methodology of verification/ certification of documents followed by the agencies is broadly as under, but not limited to: (a) It is the sole responsibility of the bidders intending to participate in the tender to thoroughly understand the requirements of the tender, particularly the documents required under BEC. The bidders must present all relevant documents to any of the empanelled third-party certifying agencies for verification/certification. The TPI Agencies shall verify the authenticity of the documents only. They will not verify whether the documents produced by the bidder are sufficient for meeting the requirements of the tender or not. Neither OIL nor the Inspection Agencies shall be responsible for the selection or appropriateness of the documents submitted for verification. It is entirely the bidder's responsibility to ensure that the appropriate documents are verified/certified in support of BEC compliance. (b) The concerned Independent Third-Party Inspection Agencies shall depute their qualified/competent inspector to the Bidder's premises to check the original documents and			

		certify the copies which the bidder shall submit along with their bids. (c) On issuance of the Inspection Certificate to the bidder, TPI agency should share a copy of the same to concerned Purchase Officer through email directly (Email ID: **jintu.borah@oilindia.in; contracts-services@oilindia.in**). OIL will reserve the right to ask the inspection agencies to verify the documents with source, if required, at no extra cost to OIL. Verification/Certification of documents by OIL's empanelled third-party inspection agencies shall not automatically make the bidder techno-commercially acceptable or eligible for award of contract. **Notes:** (i) If any documents, LOI/LOA/Orders/Contracts, etc., submitted towards BEC are issued by Oil India Limited, such documents need not be verified by TPI agency. (ii) Bidder's self-declared undertakings, Audited Balance Sheet & Profit-loss statement and/or CA certificate having UDIN are not required to be verified by the TPI agency. (iii) Undertaking from TPI Agency as per format (**PROFORMA-M**) enclosed should be submitted along with the Bid. (iv) In case of clarifications sought by OIL against BEC, supporting documents (historical in nature) to those submitted in the original bid will also have to be verified from the same TPI agency which has originally verified their bid documents. OIL shall categorically mention the documents that are to be submitted with TPI verification in the clarification sought. In case the bidder fails to submit the TPI verified documents, as sought by OIL, as			

		part of their clarification, their offer will be liable for rejection.			

SERVICE LEVEL AGREEMENT (SLA)

[Only for acceptance; not to be filled and submitted. Shall be executed during Formal Agreement.]

This Agreement is made on ____ day of _____ between Oil India Limited, a Government of India Enterprise, incorporated under the Companies Act 1956, having its registered office at Duliajan in the State of Assam, hereinafter called the "Company" which expression unless repugnant to the context shall include executors, administrators and assignees on the one part, and M/s. _____ (Name and address of Contractor) hereinafter called the "Contractor" which expression unless repugnant to the context shall include executors, administrators and assignees on the other part,

WHEREAS the Company desires that Services _____ (brief description of services) should be provided by the Contractor as detailed hereinafter or as Company may requires;

WHEREAS, Contractor engaged themselves in the business of offering such services represents that they have adequate resources and equipment, material etc. in good working order and fully trained personnel capable of efficiently undertaking the operations and is ready, willing and able to carry out the said services for the Company as per SOW attached herewith for this purpose;

WHEREAS, Company had issued a firm Letter of Award No. _____ dated _____ based on Offer No. _____ dated _____ submitted by the Contractor against Company's IFB No. _____ and the Contractor accepted the same vide _____; and

WHEREAS, the Contractor has furnished to Company the performance security in the form of _____ for ₹ _____ (being 10% of the Contract value).

All these aforesaid documents shall be deemed to form and be read and construed as part of this agreement/contract. However, should there be any dispute arising out of interpretation of this contract in regard to the terms and conditions with those mentioned in Company's tender document and subsequent letters including the Letter of Intent and Contractor's offer and their subsequent letters, the terms and conditions attached hereto shall prevail. Changes, additions or deletions to the terms of the contract shall be authorized solely by an amendment to the contract executed in the same manner as this contract.

NOW WHEREAS, in consideration of the mutual covenants and agreements hereinafter contained, it is hereby agreed as follows -

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

2. In addition to documents herein above, the following Sections and Annexures attached herewith shall be deemed to form and be read and construed as part of this agreement viz.:

(a) Schedule of Work, quantities, Units & Rates;

Contd.....P/2

(b) General Terms & Conditions (GTC);
(c) Special Terms & Conditions (STC).

3. In consideration of the payments to be made by the Company to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Company to provide the Services and to remedy defects therein in conformity in all respect with the provisions of this Contract.

4. The Company hereby covenants to pay the Contractor in consideration of the provision of the Services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of this Contract at the times and in the manner prescribed by this Contract.

IN WITNESS thereof, each party has executed this contract at Duliajan, Assam as of the date shown above.

Signed, Sealed and Delivered,

For and on behalf of Company **(Oil India Limited)**	For and on behalf of Contractor **(M/s _____)**
Signature: _____	Signature: _____
Name: _____	Name: _____
Status: _____	Status: _____
In Presence of:	In Presence of:
1. _____	1. _____
2. _____	2. _____

*********End of Tender********